

# INSIDE THE GALILEO PROJECT

M E R G E D  
P O D C A S T



1  
00:00:02,990 --> 00:00:01,670  
I can't say what I hope that we find

2  
00:00:04,610 --> 00:00:03,000  
because I don't know but I just hope

3  
00:00:06,289 --> 00:00:04,620  
that this sets a standard that you can

4  
00:00:08,450 --> 00:00:06,299  
do science that is looking into

5  
00:00:09,890 --> 00:00:08,460  
phenomena whatever that phenomena may be

6  
00:00:11,810 --> 00:00:09,900  
and I think that's one of the ways we

7  
00:00:13,789 --> 00:00:11,820  
can at least as young people like help

8  
00:00:15,530 --> 00:00:13,799  
this discussion is to just talk about it

9  
00:00:17,090 --> 00:00:15,540  
more and do it in a sense that isn't

10  
00:00:19,070 --> 00:00:17,100  
talking about Sci-Fi movies but actually

11  
00:00:28,130 --> 00:00:19,080  
talking about people's jobs and and how

12  
00:00:33,229 --> 00:00:31,250  
welcome to merge I'm Ryan Graves today

13  
00:00:35,150 --> 00:00:33,239

we're joined by Abby White

14

00:00:37,010 --> 00:00:35,160

Abby is a research fellow with the

15

00:00:38,810 --> 00:00:37,020

Galileo project at the Harvard and

16

00:00:40,850 --> 00:00:38,820

Smithsonian Center for astrophysics

17

00:00:42,590 --> 00:00:40,860

today we'll Explore her early

18

00:00:45,229 --> 00:00:42,600

involvement in this field and her work

19

00:00:47,209 --> 00:00:45,239

at the Galileo project I hope you enjoy

20

00:00:49,729 --> 00:00:47,219

this episode of the merge podcast

21

00:00:51,889 --> 00:00:49,739

now Abby away

22

00:00:54,350 --> 00:00:51,899

all right Abby thank you for joining me

23

00:00:56,029 --> 00:00:54,360

today sorry thanks for having me so I

24

00:00:58,910 --> 00:00:56,039

understand you are a fellow at the

25

00:01:00,770 --> 00:00:58,920

Galileo project is that correct yes that

26

00:01:02,330 --> 00:01:00,780

is correct awesome well before we get

27

00:01:03,290 --> 00:01:02,340

into that maybe you could tell us a

28

00:01:04,850 --> 00:01:03,300

little bit about

29

00:01:06,410 --> 00:01:04,860

um your background uh your educational

30

00:01:09,469 --> 00:01:06,420

background and where you grew up and

31

00:01:11,390 --> 00:01:09,479

kind of what took you up to being part

32

00:01:13,310 --> 00:01:11,400

of that project that effort sure

33

00:01:14,870 --> 00:01:13,320

absolutely so

34

00:01:17,030 --> 00:01:14,880

um I grew up in a small town in

35

00:01:18,590 --> 00:01:17,040

Pennsylvania called Wyomissing if you're

36

00:01:19,850 --> 00:01:18,600

a Taylor Swift fan you you would

37

00:01:21,230 --> 00:01:19,860

recognize that that that's where Taylor

38

00:01:23,690 --> 00:01:21,240

Swift is from before she moved to

39

00:01:26,270 --> 00:01:23,700

Nashville uh so I spent you know most of

40

00:01:28,190 --> 00:01:26,280

my life there for college I wanted to

41

00:01:31,010 --> 00:01:28,200

experiment go to a new city do something

42

00:01:33,770 --> 00:01:31,020

fun so I went up to Wealthy College

43

00:01:34,609 --> 00:01:33,780

which is 12 miles west of Boston and

44

00:01:36,469 --> 00:01:34,619

that's where I completed my

45

00:01:38,210 --> 00:01:36,479

undergraduate education so I was there

46

00:01:41,270 --> 00:01:38,220

for four years

47

00:01:43,069 --> 00:01:41,280

um my my decisions about you know

48

00:01:45,230 --> 00:01:43,079

pursuing different academic areas

49

00:01:47,929 --> 00:01:45,240

changed a lot while I was there not too

50

00:01:50,289 --> 00:01:47,939

much but um so I arrived and I knew I

51  
00:01:53,330 --> 00:01:50,299  
wanted to study math I always loved math

52  
00:01:55,490 --> 00:01:53,340  
but you know the math major was pretty

53  
00:01:57,590 --> 00:01:55,500  
short and I you know was ambitious I

54  
00:01:59,030 --> 00:01:57,600  
wanted to try something else as well uh

55  
00:02:00,950 --> 00:01:59,040  
Wellesley is a historical women's

56  
00:02:03,410 --> 00:02:00,960  
college and a liberal arts institution

57  
00:02:05,810 --> 00:02:03,420  
so what that means is you basically are

58  
00:02:07,249 --> 00:02:05,820  
encouraged or actually you have to uh

59  
00:02:08,749 --> 00:02:07,259  
take a bunch of different classes for

60  
00:02:11,330 --> 00:02:08,759  
distribution requirements so that you

61  
00:02:12,770 --> 00:02:11,340  
know your learning is is really rounded

62  
00:02:16,250 --> 00:02:12,780  
out and well-rounded

63  
00:02:18,530 --> 00:02:16,260

so I uh as for that reason I had to take

64

00:02:19,790 --> 00:02:18,540

a science class and in high school I

65

00:02:22,490 --> 00:02:19,800

don't know science just didn't do it for

66

00:02:24,229 --> 00:02:22,500

me I actually hated physics I wanted

67

00:02:26,089 --> 00:02:24,239

nothing to do with it

68

00:02:27,530 --> 00:02:26,099

um and I love math I know but I loved

69

00:02:29,089 --> 00:02:27,540

math so I was like oh give me equations

70

00:02:30,589 --> 00:02:29,099

that's fine but I just I don't know I

71

00:02:32,150 --> 00:02:30,599

wasn't into it and I didn't have any

72

00:02:34,670 --> 00:02:32,160

good reason why I just didn't didn't

73

00:02:36,710 --> 00:02:34,680

feel like it so

74

00:02:39,050 --> 00:02:36,720

then I was kind of dreading the science

75

00:02:40,369 --> 00:02:39,060

requirement at Wellesley and I was

76  
00:02:41,869 --> 00:02:40,379  
looking around the course browser and I

77  
00:02:43,850 --> 00:02:41,879  
saw there was astronomy and I just

78  
00:02:46,369 --> 00:02:43,860  
thought oh my gosh this is so cool when

79  
00:02:48,410 --> 00:02:46,379  
will I ever have the chance to uh you

80  
00:02:50,210 --> 00:02:48,420  
know look through a telescope we have a

81  
00:02:52,009 --> 00:02:50,220  
couple of different domes with different

82  
00:02:53,630 --> 00:02:52,019  
telescopes so I thought you know this

83  
00:02:55,610 --> 00:02:53,640  
would just be an amazing way to see a

84  
00:02:57,110 --> 00:02:55,620  
new part of campus and you know do

85  
00:02:58,729 --> 00:02:57,120  
something that's science but maybe not

86  
00:03:00,110 --> 00:02:58,739  
purely some other areas where I just

87  
00:03:01,550 --> 00:03:00,120  
didn't wasn't drawn to in high school

88  
00:03:03,890 --> 00:03:01,560

not ready to commit your life to it

89

00:03:05,330 --> 00:03:03,900

quite at that point yeah exactly so I

90

00:03:07,490 --> 00:03:05,340

just take a class you know thinking

91

00:03:08,930 --> 00:03:07,500

nothing of it signing up for it I went

92

00:03:10,970 --> 00:03:08,940

through the entire class had a great

93

00:03:14,030 --> 00:03:10,980

time but you know again like didn't

94

00:03:16,490 --> 00:03:14,040

think much of it uh until about a year

95

00:03:17,869 --> 00:03:16,500

later I I was really into math and

96

00:03:19,250 --> 00:03:17,879

computer science but then I started

97

00:03:21,050 --> 00:03:19,260

thinking about career paths you know

98

00:03:22,070 --> 00:03:21,060

after college and I was like I don't

99

00:03:23,630 --> 00:03:22,080

really want to be a software engineer

100

00:03:25,970 --> 00:03:23,640

like I want to sit at my computer all

101

00:03:27,530 --> 00:03:25,980

day and just write code but I also you

102

00:03:29,030 --> 00:03:27,540

know don't want to be stuck in a room by

103

00:03:31,369 --> 00:03:29,040

myself writing proofs not that that's

104

00:03:33,050 --> 00:03:31,379

what mathematicians do but in my mind I

105

00:03:34,610 --> 00:03:33,060

was like okay I like these two things

106

00:03:37,790 --> 00:03:34,620

but I just don't there's no career that

107

00:03:39,470 --> 00:03:37,800

is combining these two you know areas

108

00:03:41,030 --> 00:03:39,480

that it's in a way that I think is

109

00:03:43,369 --> 00:03:41,040

really cool and I'm really excited about

110

00:03:45,289 --> 00:03:43,379

so then I thought back to this astronomy

111

00:03:47,750 --> 00:03:45,299

class and I was like okay well I did a

112

00:03:50,509 --> 00:03:47,760

lot of math in that class and I know

113

00:03:52,550 --> 00:03:50,519

astronomers code so maybe I should you

114

00:03:54,170 --> 00:03:52,560

know take another class so I had this

115

00:03:57,050 --> 00:03:54,180

thought I signed up for a physics class

116

00:03:58,970 --> 00:03:57,060

you know which I was nervous for but I

117

00:04:01,190 --> 00:03:58,980

ended up just loving it I think taking

118

00:04:02,930 --> 00:04:01,200

that class in the historical women's

119

00:04:04,850 --> 00:04:02,940

college environment was what made it so

120

00:04:05,930 --> 00:04:04,860

different so you know prior to that in

121

00:04:08,390 --> 00:04:05,940

high school I was one of the only girls

122

00:04:10,369 --> 00:04:08,400

in my you know math and science courses

123

00:04:12,530 --> 00:04:10,379

and I went to public high school so you

124

00:04:14,270 --> 00:04:12,540

know there was you know not tons tons of

125

00:04:17,810 --> 00:04:14,280

resources to you know engage

126

00:04:18,830 --> 00:04:17,820

specifically like girls in stem so I

127

00:04:20,569 --> 00:04:18,840

don't know I think just being in that

128

00:04:22,850 --> 00:04:20,579

atmosphere you know I was so encouraged

129

00:04:25,249 --> 00:04:22,860

to make mistakes and not be afraid to

130

00:04:26,510 --> 00:04:25,259

like raise my hand and ask questions I

131

00:04:29,270 --> 00:04:26,520

could do the homework without being

132

00:04:31,310 --> 00:04:29,280

ridiculed for being like a nerd so I

133

00:04:33,170 --> 00:04:31,320

just I loved it for that reason and then

134

00:04:35,629 --> 00:04:33,180

do you feel like if I may interrupt yeah

135

00:04:37,189 --> 00:04:35,639

I feel like when you're we're at you

136

00:04:40,070 --> 00:04:37,199

know the educational facility you said

137

00:04:42,710 --> 00:04:40,080

that was the high school uh you're at it

138

00:04:45,409 --> 00:04:42,720

was mostly uh mostly boys in that type

139

00:04:46,909 --> 00:04:45,419

of stem education it would that lead you

140

00:04:48,050 --> 00:04:46,919

to being more uncomfortable the kind of

141

00:04:49,850 --> 00:04:48,060

raising your hand and asking those

142

00:04:51,770 --> 00:04:49,860

questions because of that Dynamic just

143

00:04:54,710 --> 00:04:51,780

because you're afraid to fail or just

144

00:04:56,330 --> 00:04:54,720

didn't want to I don't know yeah so I

145

00:05:00,170 --> 00:04:56,340

guess I have like specific memories of

146

00:05:01,670 --> 00:05:00,180

being like my AP calculus course and the

147

00:05:03,409 --> 00:05:01,680

most of the girls like sat at the front

148

00:05:05,090 --> 00:05:03,419

of the classroom and then there's like

149

00:05:06,290 --> 00:05:05,100

almost a peanut gallery of guys that

150

00:05:08,030 --> 00:05:06,300

would sit in the back of the classroom

151

00:05:09,230 --> 00:05:08,040

and I'd specifically remember like I

152

00:05:10,969 --> 00:05:09,240

would do the homework assignments

153

00:05:12,770 --> 00:05:10,979

because well for AP courses you're

154

00:05:14,870 --> 00:05:12,780

paying to take the exam to get college

155

00:05:16,249 --> 00:05:14,880

credits I was like well if I'm paying to

156

00:05:17,930 --> 00:05:16,259

be here you know I want to make the most

157

00:05:20,270 --> 00:05:17,940

out of it so I would do the homework as

158

00:05:21,469 --> 00:05:20,280

one does and I would ask questions about

159

00:05:23,810 --> 00:05:21,479

the homework every that's how class

160

00:05:25,189 --> 00:05:23,820

started the the teacher would always

161

00:05:26,270 --> 00:05:25,199

open with you know does anyone have any

162

00:05:28,490 --> 00:05:26,280

questions about the homework and I

163

00:05:30,350 --> 00:05:28,500

always did so every time I raised my

164

00:05:31,490 --> 00:05:30,360

hand there someone would make a comment

165

00:05:33,170 --> 00:05:31,500

or something from the back of the

166

00:05:35,510 --> 00:05:33,180

classroom and kind of just say like we

167

00:05:37,850 --> 00:05:35,520

get it you did the homework or like

168

00:05:39,650 --> 00:05:37,860

whatever like let's move on to class and

169

00:05:41,990 --> 00:05:39,660

I think that just really you know maybe

170

00:05:43,550 --> 00:05:42,000

subconsciously kind of contributed to me

171

00:05:45,350 --> 00:05:43,560

you know I'd sit in class and think okay

172

00:05:47,029 --> 00:05:45,360

I've asked this many questions today I

173

00:05:48,529 --> 00:05:47,039

don't want to ask any more so you know

174

00:05:50,150 --> 00:05:48,539

I've reached my quota which is just

175

00:05:51,409 --> 00:05:50,160

that's so unfortunate because you know

176

00:05:52,550 --> 00:05:51,419

everyone should be encouraged to learn

177

00:05:55,129 --> 00:05:52,560

and ask questions if they don't

178

00:05:56,330 --> 00:05:55,139

understand something uh so that makes

179

00:05:57,469 --> 00:05:56,340

sense at least when you were at

180

00:05:59,689 --> 00:05:57,479

Wellesley you seem to be surrounded by

181

00:06:02,150 --> 00:05:59,699

people that were you know interest also

182

00:06:03,890 --> 00:06:02,160

engaged in what they were learning on on

183

00:06:06,590 --> 00:06:03,900

the science side or because it was a

184

00:06:08,390 --> 00:06:06,600

little arts college did was it more kind

185

00:06:10,370 --> 00:06:08,400

of a spectator sport there the science

186

00:06:12,230 --> 00:06:10,380

yeah yeah I think it depended on which

187

00:06:13,790 --> 00:06:12,240

courses you were in you know so when

188

00:06:15,170 --> 00:06:13,800

you're taking these introductory courses

189

00:06:18,290 --> 00:06:15,180

there'd be people who are you know

190

00:06:20,570 --> 00:06:18,300

pre-med uh or or who were Humanities

191

00:06:22,370 --> 00:06:20,580

majors and you know had no intention of

192

00:06:24,409 --> 00:06:22,380

pursuing it after but I think that made

193

00:06:25,850 --> 00:06:24,419

for a really Dynamic classroom because

194

00:06:27,469 --> 00:06:25,860

everyone has something different to

195

00:06:29,150 --> 00:06:27,479

offer and different skill sets so having

196

00:06:31,129 --> 00:06:29,160

all those different opinions and and

197

00:06:34,790 --> 00:06:31,139

viewpoints in one room I think just made

198

00:06:37,370 --> 00:06:34,800

it like an amazing experience so and so

199

00:06:38,809 --> 00:06:37,380

you seem to kind of enjoy that

200

00:06:40,969 --> 00:06:38,819

experience and yes you you stuck with

201  
00:06:43,189 --> 00:06:40,979  
yeah yeah so I guess I never finished a

202  
00:06:44,930 --> 00:06:43,199  
story but um so I was in this physics

203  
00:06:47,629 --> 00:06:44,940  
class and I was actually in this class

204  
00:06:49,790 --> 00:06:47,639  
when I got the email everyone that was

205  
00:06:51,950 --> 00:06:49,800  
in college during uh March 2020 knows

206  
00:06:54,110 --> 00:06:51,960  
what I'm referring to the email that

207  
00:06:56,330 --> 00:06:54,120  
were being sent home uh and are not

208  
00:06:58,249 --> 00:06:56,340  
returning for yafkovitz not returning

209  
00:07:00,110 --> 00:06:58,259  
for the spring semester so everyone is

210  
00:07:02,090 --> 00:07:00,120  
shocked we stopped class we're like okay

211  
00:07:03,409 --> 00:07:02,100  
if you want to leave go ahead like if

212  
00:07:05,510 --> 00:07:03,419  
you need to process this in your own way

213  
00:07:06,830 --> 00:07:05,520

so code happens you know I head back

214

00:07:08,210 --> 00:07:06,840

home my family had moved to Savannah

215

00:07:09,350 --> 00:07:08,220

Georgia at this point and that's where

216

00:07:11,629 --> 00:07:09,360

we are now

217

00:07:14,150 --> 00:07:11,639

um so I went back to Georgia and I just

218

00:07:15,770 --> 00:07:14,160

did a lot of like inward reflection

219

00:07:18,350 --> 00:07:15,780

um and just thinking about again like

220

00:07:20,450 --> 00:07:18,360

post-grad what I want to do uh you know

221

00:07:22,010 --> 00:07:20,460

I don't come from a family of scientists

222

00:07:23,689 --> 00:07:22,020

so I didn't really know what was out

223

00:07:26,390 --> 00:07:23,699

there in terms of like science

224

00:07:27,770 --> 00:07:26,400

opportunities or what even like PHD

225

00:07:29,870 --> 00:07:27,780

programs or graduate school looked like

226

00:07:31,249 --> 00:07:29,880

I really had no exposure to that but

227

00:07:33,589 --> 00:07:31,259

anyway on a whim I signed up to take

228

00:07:36,170 --> 00:07:33,599

observational astronomy and this gave me

229

00:07:38,749 --> 00:07:36,180

the opportunity D2 from my bedroom in

230

00:07:41,029 --> 00:07:38,759

Georgia control a telescope 0.7 meter

231

00:07:42,890 --> 00:07:41,039

telescope up at Wellesley and that just

232

00:07:45,050 --> 00:07:42,900

like blew my mind so I think probably

233

00:07:46,730 --> 00:07:45,060

within days after you know Imaging some

234

00:07:48,290 --> 00:07:46,740

star clusters I declared a second major

235

00:07:51,770 --> 00:07:48,300

and just said you know it's my junior

236

00:07:53,210 --> 00:07:51,780

fall I got two years uh let's just you

237

00:07:55,070 --> 00:07:53,220

know pedal to the metal let's get this

238

00:07:56,749 --> 00:07:55,080

done so at that point it just became a

239

00:07:59,150 --> 00:07:56,759

race to finish as many you know

240

00:08:00,710 --> 00:07:59,160

requirements as it could and just do do

241

00:08:03,050 --> 00:08:00,720

as much research as I possibly could

242

00:08:04,610 --> 00:08:03,060

because I wasn't the girl who was you

243

00:08:05,990 --> 00:08:04,620

know looking up at the stars when I was

244

00:08:08,390 --> 00:08:06,000

really young and thinking oh I wonder

245

00:08:10,309 --> 00:08:08,400

what's out there and I just wasn't a

246

00:08:11,990 --> 00:08:10,319

space kid and I didn't watch Star Wars

247

00:08:14,390 --> 00:08:12,000

or Star Trek or any of that I just kind

248

00:08:15,529 --> 00:08:14,400

of fell into it very accidentally uh but

249

00:08:18,469 --> 00:08:15,539

yeah that's that's how I ended up at

250

00:08:22,010 --> 00:08:18,479

Astro but I guess then comes the Galileo

251

00:08:24,710 --> 00:08:22,020

project which I think is a fun story so

252

00:08:28,189 --> 00:08:24,720

that was my senior spring

253

00:08:29,089 --> 00:08:28,199

and uh you know so last semester near in

254

00:08:32,449 --> 00:08:29,099

the end

255

00:08:35,269 --> 00:08:32,459

it's insight and I have a professor who

256

00:08:36,949 --> 00:08:35,279

I'm very close with and or close he was

257

00:08:38,810 --> 00:08:36,959

an academic very important academic

258

00:08:40,370 --> 00:08:38,820

Mentor for me um and he approached me

259

00:08:42,350 --> 00:08:40,380

and he said I have an opportunity to do

260

00:08:44,570 --> 00:08:42,360

an independent study which basically

261

00:08:46,430 --> 00:08:44,580

just meant you know I get to control the

262

00:08:47,990 --> 00:08:46,440

terms of the project and I can do it at

263

00:08:49,670 --> 00:08:48,000

my own pace and then you know produce

264

00:08:51,710 --> 00:08:49,680

some kind of written report at the end

265

00:08:53,990 --> 00:08:51,720

summarizing everything I've learned and

266

00:08:55,670 --> 00:08:54,000

he approaches me and he says oh would

267

00:08:58,009 --> 00:08:55,680

you like to do an independent study on

268

00:08:59,570 --> 00:08:58,019

exotic solar system ices

269

00:09:02,509 --> 00:08:59,580

and I'm thinking

270

00:09:04,310 --> 00:09:02,519

I where did this come from I have you

271

00:09:06,530 --> 00:09:04,320

know I took planetary science with him

272

00:09:08,269 --> 00:09:06,540

but I didn't have too much experience

273

00:09:10,550 --> 00:09:08,279

with chemistry or anything but I was

274

00:09:11,810 --> 00:09:10,560

like okay I you know I really look up to

275

00:09:14,990 --> 00:09:11,820

him and I would love to work with him

276  
00:09:17,329 --> 00:09:15,000  
you know on a independent study and you

277  
00:09:18,769 --> 00:09:17,339  
know really improve my ability to do

278  
00:09:20,389 --> 00:09:18,779  
science by myself and not just you know

279  
00:09:22,550 --> 00:09:20,399  
doing problem sets and taking was this

280  
00:09:24,530 --> 00:09:22,560  
in line with what you were doing

281  
00:09:26,150 --> 00:09:24,540  
in the under course as the observational

282  
00:09:27,889 --> 00:09:26,160  
astronomy was it related to that or was

283  
00:09:29,449 --> 00:09:27,899  
it a different subset I think it was a

284  
00:09:31,310 --> 00:09:29,459  
different subset so it definitely leaned

285  
00:09:33,350 --> 00:09:31,320  
more like planetary signs so I was

286  
00:09:36,590 --> 00:09:33,360  
looking more at uh something called

287  
00:09:39,650 --> 00:09:36,600  
spectroscopy of Isis so looking at what

288  
00:09:41,389 --> 00:09:39,660

they look like in in that area uh of

289

00:09:43,430 --> 00:09:41,399

science so it wasn't I wasn't looking at

290

00:09:46,490 --> 00:09:43,440

like stars and galaxies and whatnot it

291

00:09:48,470 --> 00:09:46,500

was more at like uh election range yeah

292

00:09:50,210 --> 00:09:48,480

so I guess it was um like comets and

293

00:09:52,130 --> 00:09:50,220

asteroids is really kind of where it

294

00:09:54,110 --> 00:09:52,140

falls so

295

00:09:56,990 --> 00:09:54,120

I started to do this independent study

296

00:09:59,210 --> 00:09:57,000

and my professor is like okay and

297

00:10:02,150 --> 00:09:59,220

actually in a different class with this

298

00:10:05,090 --> 00:10:02,160

professor uh he starts talking about the

299

00:10:08,810 --> 00:10:05,100

Galileo project and uh how it was kind

300

00:10:11,930 --> 00:10:08,820

of sparked by this uh object that was

301  
00:10:14,630 --> 00:10:11,940  
observed in 2017 called I'm not sure

302  
00:10:17,449 --> 00:10:14,640  
have you heard of it yeah so subject

303  
00:10:18,530 --> 00:10:17,459  
that that flew by Interstellar object

304  
00:10:20,030 --> 00:10:18,540  
um that they didn't really know what it

305  
00:10:21,710 --> 00:10:20,040  
was they you know there's different

306  
00:10:24,110 --> 00:10:21,720  
hypotheses out there you know nitrogen

307  
00:10:26,030 --> 00:10:24,120  
Iceberg hydrogen Iceberg and then

308  
00:10:29,210 --> 00:10:26,040  
there's this other hypothesis which is

309  
00:10:32,090 --> 00:10:29,220  
was presented by Dr abilo at Harvard and

310  
00:10:35,090 --> 00:10:32,100  
he claimed that maybe this object could

311  
00:10:37,070 --> 00:10:35,100  
be a remnant of you know an

312  
00:10:39,410 --> 00:10:37,080  
extraterrestrial civilization like

313  
00:10:41,990 --> 00:10:39,420

basically space junk that for this from

314

00:10:43,490 --> 00:10:42,000

another uh system that flew by our solar

315

00:10:44,750 --> 00:10:43,500

system and we observed it just because

316

00:10:46,310 --> 00:10:44,760

there are a couple properties that were

317

00:10:48,470 --> 00:10:46,320

just like weird about it what properties

318

00:10:49,069 --> 00:10:48,480

yeah I think

319

00:10:51,050 --> 00:10:49,079

um

320

00:10:53,870 --> 00:10:51,060

there were there was non-gravitational

321

00:10:56,269 --> 00:10:53,880

acceleration when Iran around the Sun so

322

00:10:58,730 --> 00:10:56,279

no like it basically had a kick I

323

00:11:00,230 --> 00:10:58,740

believe and it's in its speed uh but so

324

00:11:02,030 --> 00:11:00,240

as it was going around the Sun and near

325

00:11:03,650 --> 00:11:02,040

the sun you would expect it to celebrate

326

00:11:05,150 --> 00:11:03,660

due to the gravity but it was

327

00:11:07,009 --> 00:11:05,160

accelerating but it was accelerating

328

00:11:08,509 --> 00:11:07,019

faster than what you would expect yeah

329

00:11:10,490 --> 00:11:08,519

exactly so it kind of it was almost like

330

00:11:12,829 --> 00:11:10,500

a kick like I think to my understanding

331

00:11:15,710 --> 00:11:12,839

from what I recall of that

332

00:11:16,910 --> 00:11:15,720

um and it it had no tail commentary tale

333

00:11:19,310 --> 00:11:16,920

so when you see a comment usually it's

334

00:11:20,930 --> 00:11:19,320

tail that's coming from uh as it gets

335

00:11:22,910 --> 00:11:20,940

closer to the sun it's you know heating

336

00:11:25,190 --> 00:11:22,920

up and the ice starts to turn into gas

337

00:11:27,170 --> 00:11:25,200

they're a process called sublimation uh

338

00:11:28,430 --> 00:11:27,180

and you know there's no tail so I was

339

00:11:29,650 --> 00:11:28,440

like okay well we can't call this thing

340

00:11:32,210 --> 00:11:29,660

a comet because it doesn't have a tail

341

00:11:34,130 --> 00:11:32,220

but it experiences kind of you know

342

00:11:35,690 --> 00:11:34,140

non-gravitational acceleration so what

343

00:11:37,910 --> 00:11:35,700

could this thing be

344

00:11:39,769 --> 00:11:37,920

um and I think you know Avi got a lot of

345

00:11:41,990 --> 00:11:39,779

criticism for that hypothesis but it's

346

00:11:43,670 --> 00:11:42,000

like we didn't have enough data to say

347

00:11:45,410 --> 00:11:43,680

if it was true or not

348

00:11:47,269 --> 00:11:45,420

um but anyway so

349

00:11:48,829 --> 00:11:47,279

then that's basically what my research

350

00:11:50,750 --> 00:11:48,839

was without me knowing it was related to

351

00:11:52,610 --> 00:11:50,760

the Galileo project and and one of their

352

00:11:54,350 --> 00:11:52,620

other branches which is you know looking

353

00:11:56,690 --> 00:11:54,360

at Interstellar objects and their

354

00:12:00,230 --> 00:11:56,700

Origins okay so that's that's how I fell

355

00:12:01,790 --> 00:12:00,240

into it so long story so yeah so you're

356

00:12:04,310 --> 00:12:01,800

you're professor at Wellesley brought

357

00:12:06,110 --> 00:12:04,320

you into a project studying uh ice

358

00:12:08,810 --> 00:12:06,120

fragments within the solar system which

359

00:12:11,389 --> 00:12:08,820

typically gets classified as comets or

360

00:12:13,550 --> 00:12:11,399

yeah yeah

361

00:12:15,710 --> 00:12:13,560

um and in this particular case there was

362

00:12:18,230 --> 00:12:15,720

an interesting Commodore asteroid or

363

00:12:20,569 --> 00:12:18,240

something else that everyone assumed was

364

00:12:22,069 --> 00:12:20,579

a comet but it didn't have the

365

00:12:26,569 --> 00:12:22,079

characteristic

366

00:12:27,829 --> 00:12:26,579

of one and perform some interesting

367

00:12:31,009 --> 00:12:27,839

things so yeah that was your

368

00:12:32,569 --> 00:12:31,019

introduction to a very cool yeah so how

369

00:12:34,009 --> 00:12:32,579

so that was your introduction to what it

370

00:12:36,350 --> 00:12:34,019

was yes

371

00:12:37,550 --> 00:12:36,360

um what what did you think when you when

372

00:12:39,590 --> 00:12:37,560

you heard that was this something you're

373

00:12:41,569 --> 00:12:39,600

like okay yeah it makes sense or was it

374

00:12:44,090 --> 00:12:41,579

did you have to step back and kind of

375

00:12:47,090 --> 00:12:44,100

reevaluate what you were what you were

376

00:12:50,030 --> 00:12:47,100

being offered in a sense to study yeah I

377

00:12:53,389 --> 00:12:50,040

mean I think I basically signed up to do

378

00:12:55,069 --> 00:12:53,399

the independent study uh so early that

379

00:12:56,629 --> 00:12:55,079

when I actually found out what it was

380

00:12:58,370 --> 00:12:56,639

about it was it was pretty much too late

381

00:13:00,290 --> 00:12:58,380

for me this didn't make any other

382

00:13:02,150 --> 00:13:00,300

decision but I was fine with that you

383

00:13:04,250 --> 00:13:02,160

know I was like this is my senior spring

384

00:13:06,889 --> 00:13:04,260

like I'm not gonna get these chances to

385

00:13:09,230 --> 00:13:06,899

engage in this kind of research again uh

386

00:13:11,750 --> 00:13:09,240

and even so the research is is valuable

387

00:13:13,430 --> 00:13:11,760

for many other applications uh so

388

00:13:15,350 --> 00:13:13,440

basically what I was doing and actually

389

00:13:17,629 --> 00:13:15,360

there's a paper from the gallery project

390

00:13:19,550 --> 00:13:17,639

that's coming out this spring I don't

391

00:13:21,470 --> 00:13:19,560

know exactly when about this but it was

392

00:13:23,690 --> 00:13:21,480

accepted so that's exciting I'm one of

393

00:13:25,250 --> 00:13:23,700

the co-authors on Instagram uh thank you

394

00:13:27,470 --> 00:13:25,260

but it's about you know physical

395

00:13:29,870 --> 00:13:27,480

considerations that we would take if we

396

00:13:31,370 --> 00:13:29,880

would want to Rendezvous with a

397

00:13:33,650 --> 00:13:31,380

Interstellar object if it was coming by

398

00:13:37,009 --> 00:13:33,660

so the first question is well how do you

399

00:13:38,449 --> 00:13:37,019

determine that something's weird so uh

400

00:13:40,250 --> 00:13:38,459

you know if we could look at something

401  
00:13:42,769 --> 00:13:40,260  
using spectroscopy and say oh well this

402  
00:13:44,449 --> 00:13:42,779  
is made of water and carbon and you know

403  
00:13:46,730 --> 00:13:44,459  
hydrogen okay well that's probably not

404  
00:13:48,590 --> 00:13:46,740  
super interesting to us we've seen

405  
00:13:50,509 --> 00:13:48,600  
things like this it's probably just you

406  
00:13:51,769 --> 00:13:50,519  
know a comet so that in that case we

407  
00:13:53,269 --> 00:13:51,779  
wouldn't want to Rendezvous but in the

408  
00:13:55,430 --> 00:13:53,279  
case of the muamua what would have been

409  
00:13:57,250 --> 00:13:55,440  
awesome is if we had something saying

410  
00:14:01,550 --> 00:13:57,260  
hey this thing is weird for XYZ reason

411  
00:14:03,290 --> 00:14:01,560  
let's go out to it and investigate it so

412  
00:14:05,269 --> 00:14:03,300  
we'd send something out there to fly by

413  
00:14:07,329 --> 00:14:05,279

with it rendezvous maybe get some

414

00:14:09,470 --> 00:14:07,339

close-up imagery or take some other

415

00:14:10,790 --> 00:14:09,480

measurements of the object and then we

416

00:14:12,410 --> 00:14:10,800

could better understand what the thing

417

00:14:13,730 --> 00:14:12,420

was because that's the thing about we

418

00:14:15,170 --> 00:14:13,740

just didn't have enough information to

419

00:14:17,090 --> 00:14:15,180

you know say what it was or we didn't

420

00:14:18,769 --> 00:14:17,100

have you know modeling that would allow

421

00:14:20,210 --> 00:14:18,779

I'll still come to a definite conclusion

422

00:14:21,949 --> 00:14:20,220

so it kind of just remains this like

423

00:14:23,870 --> 00:14:21,959

open question and it flew away from us

424

00:14:26,269 --> 00:14:23,880

so we're not ever going to catch up to

425

00:14:28,910 --> 00:14:26,279

it again why is it so difficult to to

426  
00:14:30,530 --> 00:14:28,920  
either find or do rendezvous with these

427  
00:14:34,970 --> 00:14:30,540  
I mean they're flying it just like

428  
00:14:37,610 --> 00:14:34,980  
really insanely high speeds so I think

429  
00:14:39,710 --> 00:14:37,620  
I don't know the exact speeds

430  
00:14:40,670 --> 00:14:39,720  
part of me thinks maybe 10 kilometers a

431  
00:14:42,350 --> 00:14:40,680  
second

432  
00:14:43,810 --> 00:14:42,360  
but so it's kind of like a bullet coming

433  
00:14:46,310 --> 00:14:43,820  
into the solar system

434  
00:14:47,870 --> 00:14:46,320  
so fast okay so it's on like a totally

435  
00:14:49,310 --> 00:14:47,880  
different scale of the planet things of

436  
00:14:51,650 --> 00:14:49,320  
that name right it's not in this nice

437  
00:14:53,269 --> 00:14:51,660  
orbit the stable orbit around the sun

438  
00:14:55,189 --> 00:14:53,279

like everything's moving it's coming in

439

00:14:56,870 --> 00:14:55,199

and you know maybe it flies by Jupiter

440

00:14:58,790 --> 00:14:56,880

and it might you know Jupiter has a

441

00:15:00,650 --> 00:14:58,800

large mass so it's going to change uh

442

00:15:01,910 --> 00:15:00,660

it's gonna influence it with gravity and

443

00:15:04,069 --> 00:15:01,920

it might change trajectories and

444

00:15:05,930 --> 00:15:04,079

everything so it's really hard to I mean

445

00:15:07,069 --> 00:15:05,940

we have good models for how when things

446

00:15:09,410 --> 00:15:07,079

are coming in where to predict that

447

00:15:11,810 --> 00:15:09,420

they're going to end up but um you know

448

00:15:13,670 --> 00:15:11,820

in terms of like it's it's hard to to

449

00:15:14,990 --> 00:15:13,680

pinpoint where something's going in have

450

00:15:16,910 --> 00:15:15,000

you know something out in space that's

451

00:15:19,310 --> 00:15:16,920

going to fly to it uh just because it's

452

00:15:20,629 --> 00:15:19,320

moving so fast and it just costs a lot

453

00:15:22,250 --> 00:15:20,639

of money is that but we've done that

454

00:15:24,590 --> 00:15:22,260

with other comments correct yeah or

455

00:15:27,290 --> 00:15:24,600

there is I think recently uh something

456

00:15:28,850 --> 00:15:27,300

demonstrated it was it was for more uh

457

00:15:30,530 --> 00:15:28,860

National I guess you would call it

458

00:15:32,810 --> 00:15:30,540

National Security I don't know what what

459

00:15:35,990 --> 00:15:32,820

the official term would be uh but a

460

00:15:37,490 --> 00:15:36,000

group kind of flew out a a probe or

461

00:15:39,769 --> 00:15:37,500

something of nature to smash into an

462

00:15:41,629 --> 00:15:39,779

asteroid to change its direction of

463

00:15:43,790 --> 00:15:41,639

course so we want to bash into the thing

464

00:15:45,050 --> 00:15:43,800

unless it's coming at us then we

465

00:15:46,610 --> 00:15:45,060

definitely want to do that but this

466

00:15:48,710 --> 00:15:46,620

would more just be like a flyby let's

467

00:15:50,269 --> 00:15:48,720

get some imagery or maybe close-up

468

00:15:51,889 --> 00:15:50,279

spectroscopy or other things of that

469

00:15:53,389 --> 00:15:51,899

nature about this object just so we can

470

00:15:55,670 --> 00:15:53,399

say more because we just don't have

471

00:15:57,710 --> 00:15:55,680

enough data and they're moving so fast

472

00:15:59,269 --> 00:15:57,720

we would either need to have things out

473

00:16:01,910 --> 00:15:59,279

there ready to intercept or we'd have to

474

00:16:04,550 --> 00:16:01,920

detect it early enough position to

475

00:16:05,990 --> 00:16:04,560

send something out exactly so it's kind

476

00:16:08,269 --> 00:16:06,000

of like that

477

00:16:11,090 --> 00:16:08,279

it's a give and take so you want to have

478

00:16:12,590 --> 00:16:11,100

maybe some facilities on Earth that are

479

00:16:13,970 --> 00:16:12,600

you know looking uh like the very

480

00:16:15,949 --> 00:16:13,980

Suburban Observatory that are like

481

00:16:17,389 --> 00:16:15,959

looking for these objects in the sky and

482

00:16:19,430 --> 00:16:17,399

maybe once you see one and observe one

483

00:16:21,590 --> 00:16:19,440

you're like okay well we maybe have this

484

00:16:24,590 --> 00:16:21,600

uh some kind of probe or something out

485

00:16:26,750 --> 00:16:24,600

in space in a stable orbit uh waiting

486

00:16:28,850 --> 00:16:26,760

for a green light and it's like okay I'm

487

00:16:31,009 --> 00:16:28,860

waiting for this on on Earth Observatory

488

00:16:33,829 --> 00:16:31,019

to signal that this thing is weird once

489

00:16:35,569 --> 00:16:33,839

that happens we say okay go ahead fly so

490

00:16:38,449 --> 00:16:35,579

it's you know it's really hard to

491

00:16:40,670 --> 00:16:38,459

determine that you know certain things

492

00:16:42,290 --> 00:16:40,680

about an object when it's so far away so

493

00:16:43,550 --> 00:16:42,300

that's why we lean to spectroscopy

494

00:16:45,350 --> 00:16:43,560

because it is one of those things that

495

00:16:47,030 --> 00:16:45,360

we can see and that basically that

496

00:16:48,470 --> 00:16:47,040

distance yeah exactly it's something you

497

00:16:51,530 --> 00:16:48,480

can measure with distance and it just

498

00:16:53,689 --> 00:16:51,540

gives you signatures of of you know

499

00:16:55,370 --> 00:16:53,699

different wavelengths and you can see

500

00:16:57,889 --> 00:16:55,380

absorption and emission lines and then

501  
00:17:00,470 --> 00:16:57,899  
determine based on our research and Labs

502  
00:17:01,910 --> 00:17:00,480  
those are consistent usually uh whether

503  
00:17:04,309 --> 00:17:01,920  
you observe the monitor throughout space

504  
00:17:05,929 --> 00:17:04,319  
so you can see okay this say we know if

505  
00:17:08,689 --> 00:17:05,939  
there's a dip here this means that the

506  
00:17:10,069 --> 00:17:08,699  
this is the composition so I think

507  
00:17:12,289 --> 00:17:10,079  
they're starting to do that now with

508  
00:17:15,350 --> 00:17:12,299  
jwst and exoplanet atmospheres James

509  
00:17:17,929 --> 00:17:15,360  
South James Webb Space Telescope yes so

510  
00:17:19,789 --> 00:17:17,939  
very good yeah that's fascinating uh

511  
00:17:21,949 --> 00:17:19,799  
what are we using to detect these

512  
00:17:23,689 --> 00:17:21,959  
smaller objects before they get in the

513  
00:17:25,370 --> 00:17:23,699

solar system if we can do we have that

514

00:17:26,689 --> 00:17:25,380

capability yet or do we have to wait for

515

00:17:28,370 --> 00:17:26,699

them to get closer and then we find them

516

00:17:30,530 --> 00:17:28,380

and we can figure out that came from

517

00:17:31,850 --> 00:17:30,540

external to our solar system after the

518

00:17:33,169 --> 00:17:31,860

fact

519

00:17:37,010 --> 00:17:33,179

I actually don't know too much about

520

00:17:39,470 --> 00:17:37,020

that myself but I know like for instance

521

00:17:42,830 --> 00:17:39,480

in other aspect of the Galileo project

522

00:17:44,690 --> 00:17:42,840

another Branch along still still working

523

00:17:47,450 --> 00:17:44,700

towards that Interstellar object Origins

524

00:17:49,070 --> 00:17:47,460

kind of research goal is they have an

525

00:17:50,930 --> 00:17:49,080

expedition going out to Papua New Guinea

526

00:17:54,230 --> 00:17:50,940

that's looking to retrieve fragments of

527

00:17:55,370 --> 00:17:54,240

an Interstellar object so uh that for

528

00:17:56,750 --> 00:17:55,380

instance they were able to track that

529

00:17:58,370 --> 00:17:56,760

trajectory and then based on its

530

00:18:00,049 --> 00:17:58,380

trajectory determine okay this did not

531

00:18:01,669 --> 00:18:00,059

come from our solar system so I think

532

00:18:04,190 --> 00:18:01,679

that's just like theoretical physics you

533

00:18:05,330 --> 00:18:04,200

know calculating trajectories but at

534

00:18:06,770 --> 00:18:05,340

that point I think you have to wait till

535

00:18:08,510 --> 00:18:06,780

it's close enough that we can you know

536

00:18:10,070 --> 00:18:08,520

resolve it and see it in the sky with

537

00:18:12,529 --> 00:18:10,080

our telescopes and I mean telescopes are

538

00:18:14,150 --> 00:18:12,539

getting better every year so as we get

539

00:18:15,710 --> 00:18:14,160

more and more telescopes or even things

540

00:18:17,930 --> 00:18:15,720

out into space you don't have to fight

541

00:18:20,450 --> 00:18:17,940

the atmosphere when you're observing you

542

00:18:23,390 --> 00:18:20,460

know you're not inhibited by a cloudy

543

00:18:25,070 --> 00:18:23,400

night per se so you know as as you know

544

00:18:26,510 --> 00:18:25,080

even more as like private space

545

00:18:28,130 --> 00:18:26,520

companies come into the sphere I don't

546

00:18:31,070 --> 00:18:28,140

know how open they are with their data

547

00:18:32,810 --> 00:18:31,080

but uh you know as we get more or this

548

00:18:34,730 --> 00:18:32,820

as these Technologies develop and as we

549

00:18:37,190 --> 00:18:34,740

just get simply more of them there will

550

00:18:39,590 --> 00:18:37,200

be more eyes on the sky so well one of

551  
00:18:43,130 --> 00:18:39,600  
the things I understand that for the for

552  
00:18:46,730 --> 00:18:43,140  
the object that is in the ocean that the

553  
00:18:49,610 --> 00:18:46,740  
Galileo project or Dr Ivy Lowe was

554  
00:18:50,210 --> 00:18:49,620  
talking about going and investigating

555  
00:18:52,789 --> 00:18:50,220  
um

556  
00:18:54,950 --> 00:18:52,799  
they had uh they had a supposition about

557  
00:18:58,250 --> 00:18:54,960  
that particular object and they were

558  
00:19:00,650 --> 00:18:58,260  
waiting for additional data from uh

559  
00:19:03,049 --> 00:19:00,660  
classified systems that confirm uh

560  
00:19:05,990 --> 00:19:03,059  
whether or not the trajectory was truly

561  
00:19:08,210 --> 00:19:06,000  
extrasolar right that's my understanding

562  
00:19:09,590 --> 00:19:08,220  
can you speak to that at all yeah I wish

563  
00:19:11,870 --> 00:19:09,600

I could speak more to it I'm actually

564

00:19:13,490 --> 00:19:11,880

that's the one branch that I haven't

565

00:19:15,830 --> 00:19:13,500

really you know been involved with too

566

00:19:18,230 --> 00:19:15,840

much but I know I think they were able

567

00:19:19,250 --> 00:19:18,240

to there's some calculation that they

568

00:19:21,650 --> 00:19:19,260

were doing where they were just trying

569

00:19:22,669 --> 00:19:21,660

to pinpoint like where exactly it was

570

00:19:24,590 --> 00:19:22,679

um and I think they were waiting on

571

00:19:25,789 --> 00:19:24,600

information there uh because the

572

00:19:27,230 --> 00:19:25,799

government had tracked it because you

573

00:19:30,350 --> 00:19:27,240

know if something's flying into the

574

00:19:31,549 --> 00:19:30,360

Earth you the government's on it uh so

575

00:19:33,650 --> 00:19:31,559

since it was the ocean you know it

576

00:19:35,390 --> 00:19:33,660

wasn't a threat or anything but uh they

577

00:19:37,430 --> 00:19:35,400

were trying to you know pinpoint that

578

00:19:39,529 --> 00:19:37,440

location and I think they're waiting for

579

00:19:41,029 --> 00:19:39,539

more data for that front but I think

580

00:19:42,350 --> 00:19:41,039

they were able to make progress with

581

00:19:44,090 --> 00:19:42,360

their calculations or something to

582

00:19:46,010 --> 00:19:44,100

improve the resolution but that's that's

583

00:19:48,289 --> 00:19:46,020

as far as I know yeah I think I remember

584

00:19:50,450 --> 00:19:48,299

them being a little bit frustrated I

585

00:19:52,310 --> 00:19:50,460

guess with the fact that they were

586

00:19:53,690 --> 00:19:52,320

trying to do this for Science and you

587

00:19:55,430 --> 00:19:53,700

know the government wasn't necessarily

588

00:19:57,950 --> 00:19:55,440

cooperating but they have their reasons

589

00:19:59,930 --> 00:19:57,960

and and we have ours so yeah you know

590

00:20:02,570 --> 00:19:59,940

it's uh it's a trend that I've seen and

591

00:20:04,310 --> 00:20:02,580

it's not necessarily a negative thing

592

00:20:06,470 --> 00:20:04,320

um we put a lot of money and effort into

593

00:20:09,950 --> 00:20:06,480

developing weapons and systems and

594

00:20:12,890 --> 00:20:09,960

sensors within the government and those

595

00:20:14,390 --> 00:20:12,900

things typically we like to hide how

596

00:20:17,029 --> 00:20:14,400

well they work obviously from our

597

00:20:19,370 --> 00:20:17,039

adversaries exactly yeah

598

00:20:20,690 --> 00:20:19,380

and so you know this is uh it doesn't

599

00:20:22,970 --> 00:20:20,700

necessarily mean the information that is

600

00:20:24,350 --> 00:20:22,980

captured is classified but just the fact

601  
00:20:26,450 --> 00:20:24,360  
that you could detect something at a

602  
00:20:27,890 --> 00:20:26,460  
particular range or know the size or the

603  
00:20:29,810 --> 00:20:27,900  
resolution

604  
00:20:32,029 --> 00:20:29,820  
um and that's what we see a lot in um

605  
00:20:33,529 --> 00:20:32,039  
the unidentified anomalous phenomenon

606  
00:20:35,090 --> 00:20:33,539  
area

607  
00:20:37,070 --> 00:20:35,100  
um when I was flying we were seeing

608  
00:20:38,450 --> 00:20:37,080  
objects on the radar the objects

609  
00:20:40,909 --> 00:20:38,460  
themselves weren't necessarily

610  
00:20:43,789 --> 00:20:40,919  
classified uh at least no one told me

611  
00:20:45,529 --> 00:20:43,799  
that but the systems we are capturing it

612  
00:20:48,169 --> 00:20:45,539  
on such as The Radars and everything

613  
00:20:50,990 --> 00:20:48,179

else were classified

614

00:20:52,490 --> 00:20:51,000

um in the Galileo project now you know I

615

00:20:55,430 --> 00:20:52,500

believe one of their tag lines is the

616

00:20:57,110 --> 00:20:55,440

the sky is not classified yeah but maybe

617

00:20:58,970 --> 00:20:57,120

you can talk about what their goals are

618

00:21:00,890 --> 00:20:58,980

now and how they're trying to

619

00:21:04,430 --> 00:21:00,900

essentially gather data outside the

620

00:21:06,710 --> 00:21:04,440

realm of of government oversight sure so

621

00:21:10,909 --> 00:21:06,720

at a high level I would say the goal of

622

00:21:13,909 --> 00:21:10,919

the Galileo project is to bring the

623

00:21:16,430 --> 00:21:13,919

search for signatures of

624

00:21:18,590 --> 00:21:16,440

extraterrestrial civilizations to a

625

00:21:21,710 --> 00:21:18,600

standard where there is rigorous

626

00:21:23,810 --> 00:21:21,720

scientific investigation and there are

627

00:21:25,250 --> 00:21:23,820

you know credible instruments and people

628

00:21:26,750 --> 00:21:25,260

Behind These discoveries basically

629

00:21:28,789 --> 00:21:26,760

bringing science to the conversation

630

00:21:33,169 --> 00:21:28,799

because I think that's something that's

631

00:21:36,110 --> 00:21:33,179

been perhaps missing uh

632

00:21:37,730 --> 00:21:36,120

in in recent history so I mean why do

633

00:21:41,029 --> 00:21:37,740

you think that is

634

00:21:44,570 --> 00:21:41,039

I wish I knew it's it's hard for me to

635

00:21:46,730 --> 00:21:44,580

imagine that because I think you know

636

00:21:49,250 --> 00:21:46,740

most people I talk to even friends

637

00:21:50,690 --> 00:21:49,260

colleagues family uh are so interested

638

00:21:52,010 --> 00:21:50,700

in the subject and they're like yeah

639

00:21:53,750 --> 00:21:52,020

totally like we should look at something

640

00:21:57,590 --> 00:21:53,760

we don't understand it

641

00:22:00,710 --> 00:21:57,600

um and I think the only thing that that

642

00:22:02,270 --> 00:22:00,720

I can justify this with is just that it

643

00:22:03,590 --> 00:22:02,280

it makes people an authority

644

00:22:06,529 --> 00:22:03,600

uncomfortable

645

00:22:08,270 --> 00:22:06,539

so I guess what I mean by that is and I

646

00:22:09,289 --> 00:22:08,280

guess we've seen this kind of in

647

00:22:11,330 --> 00:22:09,299

different cases in a little bit

648

00:22:13,909 --> 00:22:11,340

different ways so

649

00:22:16,310 --> 00:22:13,919

with astronomy there is like dark matter

650

00:22:18,590 --> 00:22:16,320

and dark energy this has you know been

651  
00:22:20,630 --> 00:22:18,600  
shown to make up a vast majority of our

652  
00:22:21,950 --> 00:22:20,640  
universe but scientists really don't

653  
00:22:23,210 --> 00:22:21,960  
know what's going on with it that's why

654  
00:22:24,590 --> 00:22:23,220  
we call it dark matter and dark energy

655  
00:22:27,470 --> 00:22:24,600  
because we're like oh it's dark we don't

656  
00:22:28,850 --> 00:22:27,480  
know what it is uh so there's a whole

657  
00:22:33,110 --> 00:22:28,860  
study about like trying to figure out

658  
00:22:36,409 --> 00:22:33,120  
what exactly that is and for some reason

659  
00:22:37,850 --> 00:22:36,419  
that is fine to do you know when we

660  
00:22:39,289 --> 00:22:37,860  
don't understand something okay let's

661  
00:22:41,990 --> 00:22:39,299  
look into it but when it comes to UAP

662  
00:22:44,090 --> 00:22:42,000  
that same logic isn't applied and I

663  
00:22:46,850 --> 00:22:44,100

think this kind of has to play into what

664

00:22:48,590 --> 00:22:46,860

I might foresee as a paradigm shift

665

00:22:51,230 --> 00:22:48,600

occurring in the future if we would make

666

00:22:53,810 --> 00:22:51,240

more progress so what I mean by that

667

00:22:57,049 --> 00:22:53,820

um a paradigm is basically a belief

668

00:22:58,730 --> 00:22:57,059

system or theory that provides like a

669

00:23:02,270 --> 00:22:58,740

unifying explanation for a set of

670

00:23:04,010 --> 00:23:02,280

phenomena or you know in some Fields so

671

00:23:07,610 --> 00:23:04,020

a set of phenomena in some field

672

00:23:10,850 --> 00:23:07,620

and it usually also suggests methods for

673

00:23:12,230 --> 00:23:10,860

which ideas are tested or knowledge is

674

00:23:15,710 --> 00:23:12,240

advanced

675

00:23:17,750 --> 00:23:15,720

so uh paradigms you know are upheld in

676

00:23:19,909 --> 00:23:17,760

numerous ways one being the power of

677

00:23:21,950 --> 00:23:19,919

authority right so if the authority

678

00:23:24,169 --> 00:23:21,960

figures are kind of

679

00:23:26,390 --> 00:23:24,179

speaking this Paradigm and and you know

680

00:23:28,010 --> 00:23:26,400

people are buying into it that you know

681

00:23:31,250 --> 00:23:28,020

people aren't going to go get sorority

682

00:23:33,710 --> 00:23:31,260

for many for many and various reasons so

683

00:23:35,090 --> 00:23:33,720

that keeps paradigms in place we also

684

00:23:37,789 --> 00:23:35,100

have the Human Experience we're

685

00:23:40,070 --> 00:23:37,799

imperfect so you're going to have uh you

686

00:23:42,049 --> 00:23:40,080

know people are irrational sometimes we

687

00:23:45,289 --> 00:23:42,059

are emotionally attached to certain

688

00:23:47,570 --> 00:23:45,299

ideas we also have you know denialism

689

00:23:50,690 --> 00:23:47,580

when it comes with coping with cognitive

690

00:23:53,510 --> 00:23:50,700

dissonance uh and then we also you know

691

00:23:54,830 --> 00:23:53,520

have this taboo stigma and ridicule that

692

00:23:57,049 --> 00:23:54,840

comes with ideas that are outside of

693

00:23:59,450 --> 00:23:57,059

these paradigms so I think two examples

694

00:24:01,010 --> 00:23:59,460

that you know we've seen in what I might

695

00:24:02,990 --> 00:24:01,020

say is recent history are like

696

00:24:05,990 --> 00:24:03,000

heliocentrism and germ Theory

697

00:24:07,909 --> 00:24:06,000

so heliocentrism is the idea that the

698

00:24:09,289 --> 00:24:07,919

sun is at the center of the universe or

699

00:24:12,110 --> 00:24:09,299

sorry not the universe the solar system

700

00:24:15,470 --> 00:24:12,120

sun is at the center of the solar system

701  
00:24:17,090 --> 00:24:15,480  
and this was not agreed upon for you

702  
00:24:18,770 --> 00:24:17,100  
know a long time they thought you know

703  
00:24:21,710 --> 00:24:18,780  
the Earth was the center of everything

704  
00:24:23,149 --> 00:24:21,720  
and everything was rotated around us uh

705  
00:24:26,029 --> 00:24:23,159  
but actually this is where the Galileo

706  
00:24:28,370 --> 00:24:26,039  
project got our name from uh Galileo

707  
00:24:30,169 --> 00:24:28,380  
used his telescope to make observations

708  
00:24:32,750 --> 00:24:30,179  
to find direct evidence that was

709  
00:24:33,950 --> 00:24:32,760  
disproving us this idea that the Earth

710  
00:24:36,110 --> 00:24:33,960  
was at the center of the Solar System's

711  
00:24:37,490 --> 00:24:36,120  
Paradigm yeah exactly so

712  
00:24:38,630 --> 00:24:37,500  
people refuse to look through his

713  
00:24:40,130 --> 00:24:38,640

telescope because they were either

714

00:24:41,090 --> 00:24:40,140

freaked out authority figures were like

715

00:24:42,890 --> 00:24:41,100

well we don't want to deal with the

716

00:24:44,690 --> 00:24:42,900

aftermath you know of a paradigm shift

717

00:24:45,830 --> 00:24:44,700

because you know people who knows what

718

00:24:48,070 --> 00:24:45,840

that's going to do it's disruptive

719

00:24:50,270 --> 00:24:48,080

status quo yes exactly

720

00:24:51,770 --> 00:24:50,280

so people refuse to look through his

721

00:24:53,630 --> 00:24:51,780

telescope and then eventually you know

722

00:24:54,649 --> 00:24:53,640

more and more people just came out with

723

00:24:56,450 --> 00:24:54,659

this and they're like guys this just

724

00:24:57,950 --> 00:24:56,460

doesn't make sense uh so they're like

725

00:25:00,110 --> 00:24:57,960

okay we're gonna throw that whole

726

00:25:01,970 --> 00:25:00,120

earth-centric Theory out and now we've

727

00:25:03,770 --> 00:25:01,980

adopted to heliocentrism and now you

728

00:25:05,390 --> 00:25:03,780

know people in our age oh yeah Sun

729

00:25:07,070 --> 00:25:05,400

Center the solar system we'd never doubt

730

00:25:09,649 --> 00:25:07,080

it and that just had to come along with

731

00:25:11,210 --> 00:25:09,659

time uh and then germ Theory which I

732

00:25:13,190 --> 00:25:11,220

don't know too much about I'm not in the

733

00:25:14,570 --> 00:25:13,200

medical field but I think it's the idea

734

00:25:16,789 --> 00:25:14,580

that um

735

00:25:18,890 --> 00:25:16,799

certain diseases are caused by like

736

00:25:20,090 --> 00:25:18,900

microorganisms invading the body so that

737

00:25:22,250 --> 00:25:20,100

was something that wasn't you know

738

00:25:23,990 --> 00:25:22,260

necessarily agreed upon in that it was

739

00:25:25,490 --> 00:25:24,000

controversial yeah so it's like you

740

00:25:26,450 --> 00:25:25,500

don't get Scarlet Letter stamped with a

741

00:25:27,950 --> 00:25:26,460

disease it's like oh they're actually

742

00:25:29,930 --> 00:25:27,960

things that can like just make you sick

743

00:25:31,730 --> 00:25:29,940

and then you can pass it to one another

744

00:25:33,350 --> 00:25:31,740

and in that way so it's funny to think

745

00:25:36,529 --> 00:25:33,360

about those things I'm like oh that's so

746

00:25:37,789 --> 00:25:36,539

insane uh so I think you know dare I say

747

00:25:39,289 --> 00:25:37,799

we may be on the verge of something

748

00:25:41,570 --> 00:25:39,299

whether it comes to you know Dark Matter

749

00:25:42,769 --> 00:25:41,580

Dark Energy quantum mechanics all that

750

00:25:44,269 --> 00:25:42,779

there might be a paradigm shift and

751

00:25:46,250 --> 00:25:44,279

that's going to happen with that but

752

00:25:48,890 --> 00:25:46,260

even uip I think I think to answer your

753

00:25:50,870 --> 00:25:48,900

question that is why it hasn't received

754

00:25:53,210 --> 00:25:50,880

the scientific attention is because it's

755

00:25:56,210 --> 00:25:53,220

it's scary people are scared but it is

756

00:25:59,330 --> 00:25:56,220

yeah and I think it also

757

00:26:02,570 --> 00:25:59,340

um even perhaps more so than

758

00:26:05,510 --> 00:26:02,580

um heliocentricity uh directly attacks

759

00:26:08,149 --> 00:26:05,520

our kind of high status as

760

00:26:09,529 --> 00:26:08,159

um you know our our only inhabitants of

761

00:26:12,590 --> 00:26:09,539

this universe in a sense right it

762

00:26:15,950 --> 00:26:12,600

directly challenges our our place there

763

00:26:19,130 --> 00:26:15,960

um our eccentricity wait that's the

764

00:26:23,090 --> 00:26:21,049

um heliocentrism

765

00:26:25,789 --> 00:26:23,100

redefines our place universe but yeah

766

00:26:28,370 --> 00:26:25,799

this really defines our you know our

767

00:26:31,010 --> 00:26:28,380

position of ourselves within the

768

00:26:33,350 --> 00:26:31,020

universe exactly oh yeah

769

00:26:35,750 --> 00:26:33,360

and yeah that can be scary that can be

770

00:26:37,850 --> 00:26:35,760

scary do you think science

771

00:26:39,289 --> 00:26:37,860

do you think science can overcome that

772

00:26:42,830 --> 00:26:39,299

just with that or do you think there's

773

00:26:44,269 --> 00:26:42,840

going to be other you know sociological

774

00:26:45,590 --> 00:26:44,279

um

775

00:26:48,110 --> 00:26:45,600

I don't know what the right word is

776

00:26:50,210 --> 00:26:48,120

tools or you know things that we need to

777

00:26:51,830 --> 00:26:50,220

do to move people past this barrier or

778

00:26:54,470 --> 00:26:51,840

is this truly do you think just about

779

00:26:56,450 --> 00:26:54,480

data and communication

780

00:26:59,029 --> 00:26:56,460

yeah I mean

781

00:27:01,850 --> 00:26:59,039

I don't think that you can kind of have

782

00:27:03,649 --> 00:27:01,860

one of those things without the other so

783

00:27:07,370 --> 00:27:03,659

your sign says nothing if you can't

784

00:27:08,390 --> 00:27:07,380

communicate it so and that goes for all

785

00:27:10,250 --> 00:27:08,400

Sciences you think that's gonna be

786

00:27:12,350 --> 00:27:10,260

enough though for some people to see

787

00:27:13,310 --> 00:27:12,360

yeah no I don't I don't think so I I

788

00:27:14,870 --> 00:27:13,320

really don't think so which is

789

00:27:16,070 --> 00:27:14,880

unfortunate I mean we as a scientist I'm

790

00:27:17,990 --> 00:27:16,080

like yeah show me the data like that's

791

00:27:18,890 --> 00:27:18,000

good for me but I know not everyone's

792

00:27:20,870 --> 00:27:18,900

like that

793

00:27:23,269 --> 00:27:20,880

um some people I think if you don't have

794

00:27:25,370 --> 00:27:23,279

a site a citing story you know you might

795

00:27:26,450 --> 00:27:25,380

not be within the the UAP Community

796

00:27:27,649 --> 00:27:26,460

might be like oh well you don't really

797

00:27:29,810 --> 00:27:27,659

you haven't seen it you're not really

798

00:27:31,370 --> 00:27:29,820

one of us I haven't experienced that but

799

00:27:32,870 --> 00:27:31,380

I can imagine that that might be the

800

00:27:34,310 --> 00:27:32,880

kind of mentality that some people have

801  
00:27:36,529 --> 00:27:34,320  
with it

802  
00:27:38,630 --> 00:27:36,539  
um again I haven't experienced that so I

803  
00:27:40,250 --> 00:27:38,640  
can't say for sure but I do think you

804  
00:27:42,470 --> 00:27:40,260  
know that's why the Galileo project we

805  
00:27:44,149 --> 00:27:42,480  
have a societal implications group and

806  
00:27:45,649 --> 00:27:44,159  
you know those are philosophers social

807  
00:27:48,110 --> 00:27:45,659  
scientists who are just really thinking

808  
00:27:49,970 --> 00:27:48,120  
about you know once we publish papers

809  
00:27:51,350 --> 00:27:49,980  
and are getting data how is that how are

810  
00:27:53,090 --> 00:27:51,360  
we going to communicate that and how is

811  
00:27:55,370 --> 00:27:53,100  
that going to impact you know society as

812  
00:27:56,930 --> 00:27:55,380  
a whole oh that sounds fascinating when

813  
00:27:58,130 --> 00:27:56,940

you guys have papers coming out in that

814

00:28:01,010 --> 00:27:58,140

direction

815

00:28:03,769 --> 00:28:01,020

um I'm not sure actually I think uh we

816

00:28:05,570 --> 00:28:03,779

have one two papers that are kind of you

817

00:28:07,490 --> 00:28:05,580

know higher level and I'm hoping they

818

00:28:09,230 --> 00:28:07,500

well I I've read them I think they're

819

00:28:10,430 --> 00:28:09,240

you know people can engage with them you

820

00:28:12,409 --> 00:28:10,440

don't have to have necessarily like a

821

00:28:13,370 --> 00:28:12,419

rigorous scientific background but one

822

00:28:14,990 --> 00:28:13,380

of them is about you know just an

823

00:28:16,669 --> 00:28:15,000

overview of the project and then that

824

00:28:18,230 --> 00:28:16,679

one's written by Dr abilo and then

825

00:28:20,090 --> 00:28:18,240

there's another paper written by Dr Wes

826

00:28:21,950 --> 00:28:20,100

Waters at Wellesley College that is just

827

00:28:23,990 --> 00:28:21,960

giving kind of the history of of UAP

828

00:28:26,330 --> 00:28:24,000

studies and and outlining our approach

829

00:28:29,149 --> 00:28:26,340

as well and how we fit into that awesome

830

00:28:30,950 --> 00:28:29,159

very interesting So speaking of how you

831

00:28:32,570 --> 00:28:30,960

fit in what about yourself so what what

832

00:28:34,130 --> 00:28:32,580

is specifically you're doing to help the

833

00:28:36,529 --> 00:28:34,140

Galileo project now what is your title

834

00:28:37,610 --> 00:28:36,539

within that effort yeah yeah yeah so I

835

00:28:39,110 --> 00:28:37,620

talked a little bit about kind of the

836

00:28:40,850 --> 00:28:39,120

two other branches but the one that's

837

00:28:43,730 --> 00:28:40,860

the most relevant to this podcast is the

838

00:28:45,169 --> 00:28:43,740

UAP Branch so uh that's definitely uh

839

00:28:47,510 --> 00:28:45,179

you know where I spend most of my time

840

00:28:49,250 --> 00:28:47,520

now so within that effort I'm working on

841

00:28:51,169 --> 00:28:49,260

instrumentation so I'm on the ground

842

00:28:53,710 --> 00:28:51,179

building things you know troubleshooting

843

00:28:57,049 --> 00:28:53,720

Hardware debugging all that fun stuff

844

00:28:58,789 --> 00:28:57,059

and I started that uh four days after

845

00:29:01,730 --> 00:28:58,799

graduating actually from undergrad at

846

00:29:03,289 --> 00:29:01,740

Wellesley I just went right into it and

847

00:29:06,230 --> 00:29:03,299

I started off just as like a summer

848

00:29:09,110 --> 00:29:06,240

research fellow so my time was supposed

849

00:29:10,669 --> 00:29:09,120

to be 50 with Wellesley 50 with Harvard

850

00:29:12,230 --> 00:29:10,679

um I should also mention that Wellesley

851

00:29:13,669 --> 00:29:12,240

has a smaller subgroup within the

852

00:29:15,409 --> 00:29:13,679

Galileo project related they call

853

00:29:17,750 --> 00:29:15,419

themselves Celeste which is Galileo's

854

00:29:19,669 --> 00:29:17,760

daughter's name which makes sense uh so

855

00:29:22,070 --> 00:29:19,679

they have a small group working there as

856

00:29:24,350 --> 00:29:22,080

well uh because within this UAP you know

857

00:29:26,450 --> 00:29:24,360

goal we have an observatory class system

858

00:29:28,310 --> 00:29:26,460

that's you know what I work with now

859

00:29:32,389 --> 00:29:28,320

that's your like about on the scale of

860

00:29:34,190 --> 00:29:32,399

250 000 and then we have uh you know one

861

00:29:35,690 --> 00:29:34,200

level below that order magnitude below

862

00:29:37,430 --> 00:29:35,700

that and that's what Wellesley is

863

00:29:38,750 --> 00:29:37,440

working on so they're you know aiming

864

00:29:41,149 --> 00:29:38,760

for about twenty five thousand dollars

865

00:29:42,950 --> 00:29:41,159

kind of like a rack mount uh oh I should

866

00:29:45,169 --> 00:29:42,960

mention sorry I should say so you have

867

00:29:47,930 --> 00:29:45,179

the observatory class system about 250

868

00:29:50,269 --> 00:29:47,940

000 uh that's you know what I work with

869

00:29:51,710 --> 00:29:50,279

most and then we also have Wellesley

870

00:29:54,230 --> 00:29:51,720

system which is a level below that

871

00:29:56,389 --> 00:29:54,240

that's 25 000 it's a non-weatherized

872

00:29:58,370 --> 00:29:56,399

system but it gives you you know enough

873

00:30:00,470 --> 00:29:58,380

things that you know we still have some

874

00:30:02,810 --> 00:30:00,480

IR cameras we have a microphone it's

875

00:30:05,269 --> 00:30:02,820

just maybe not as expensive as you know

876

00:30:06,769 --> 00:30:05,279

the highest level and then below that we

877

00:30:09,529 --> 00:30:06,779

have like a rack mount system and that

878

00:30:10,850 --> 00:30:09,539

we're aiming for about like uh two

879

00:30:12,830 --> 00:30:10,860

thousand five hundred dollars so that's

880

00:30:14,330 --> 00:30:12,840

kind of like our our three tiered

881

00:30:17,750 --> 00:30:14,340

approach because you know we can't

882

00:30:19,430 --> 00:30:17,760

expect to uh everyone to have oh okay

883

00:30:21,590 --> 00:30:19,440

yeah I have a quarter of a million

884

00:30:23,389 --> 00:30:21,600

dollars to give let me just have this

885

00:30:24,830 --> 00:30:23,399

Observatory class system on my roof um

886

00:30:26,630 --> 00:30:24,840

not everyone has a roof that you know

887

00:30:27,889 --> 00:30:26,640

has something that big so you know we

888

00:30:29,810 --> 00:30:27,899

kind of make these different levels so

889

00:30:31,490 --> 00:30:29,820

that we can engage in the best way

890

00:30:32,990 --> 00:30:31,500

possible especially you know if there's

891

00:30:35,690 --> 00:30:33,000

an area where you know sightings start

892

00:30:37,310 --> 00:30:35,700

to pop up we can bring the the rack

893

00:30:38,750 --> 00:30:37,320

mount system or the Wellesley system

894

00:30:40,549 --> 00:30:38,760

that's non-weatherized and just kind of

895

00:30:41,990 --> 00:30:40,559

set it up temporarily and just get some

896

00:30:43,669 --> 00:30:42,000

data so that's kind of the reasoning

897

00:30:45,590 --> 00:30:43,679

behind those three but yeah just working

898

00:30:47,269 --> 00:30:45,600

on instrumentation and supporting the

899

00:30:49,669 --> 00:30:47,279

group so I don't really have a fancy

900

00:30:51,169 --> 00:30:49,679

name I'm just a research fellow but what

901  
00:30:53,090 --> 00:30:51,179  
kind of instruments are on let's say

902  
00:30:54,289 --> 00:30:53,100  
maybe the largest one there I assume

903  
00:30:55,850 --> 00:30:54,299  
that has the most sensors I could be

904  
00:30:56,870 --> 00:30:55,860  
wrong but yeah exactly has the most

905  
00:30:59,090 --> 00:30:56,880  
sensors

906  
00:31:00,710 --> 00:30:59,100  
um what are you looking for yeah I feel

907  
00:31:01,909 --> 00:31:00,720  
like we're just casting a wide net

908  
00:31:03,950 --> 00:31:01,919  
because we don't really know what to

909  
00:31:06,230 --> 00:31:03,960  
look for so we're trying to cover all

910  
00:31:08,810 --> 00:31:06,240  
bases so let's see if I can list all of

911  
00:31:11,570 --> 00:31:08,820  
them uh so we have an audio system

912  
00:31:14,090 --> 00:31:11,580  
that's recording you know audible range

913  
00:31:17,289 --> 00:31:14,100

but also infrasound and ultrasound range

914

00:31:20,090 --> 00:31:17,299

then we have an infrared camera system

915

00:31:22,610 --> 00:31:20,100

and that's made up it kind of looks like

916

00:31:24,649 --> 00:31:22,620

uh it's called the Dalek we call it kind

917

00:31:26,269 --> 00:31:24,659

maybe looks like R2D2 uh you'll see

918

00:31:27,529 --> 00:31:26,279

pictures in the papers and they're

919

00:31:28,970 --> 00:31:27,539

probably if you go and they got like a

920

00:31:30,529 --> 00:31:28,980

project website you can see videos of

921

00:31:32,149 --> 00:31:30,539

our instrumentation

922

00:31:33,529 --> 00:31:32,159

um or some of it at least so that's one

923

00:31:35,810 --> 00:31:33,539

that's on there and that is made up of

924

00:31:37,850 --> 00:31:35,820

some boson cameras and infrared around

925

00:31:40,070 --> 00:31:37,860

the base and then one on the top that's

926  
00:31:41,570 --> 00:31:40,080  
looking you know at the Zenith kind of

927  
00:31:43,250 --> 00:31:41,580  
area location which is like right above

928  
00:31:45,289 --> 00:31:43,260  
had overhead

929  
00:31:47,029 --> 00:31:45,299  
um and then it's ozone detected oh it's

930  
00:31:49,310 --> 00:31:47,039  
just it's a type of camera got it yeah

931  
00:31:52,789 --> 00:31:49,320  
yeah yeah it's a it's like a company I

932  
00:31:55,370 --> 00:31:52,799  
think very good at that yeah so then we

933  
00:31:56,690 --> 00:31:55,380  
also have a visible camera so that's

934  
00:31:58,310 --> 00:31:56,700  
like if you sat with your eyes and

935  
00:32:01,130 --> 00:31:58,320  
looked up the sky but in high resolution

936  
00:32:02,450 --> 00:32:01,140  
I'm kind of blind so I would not uh see

937  
00:32:04,970 --> 00:32:02,460  
as well as this camera one but that's

938  
00:32:07,190 --> 00:32:04,980

like 4K resolution and then we also have

939

00:32:09,230 --> 00:32:07,200

a tracking camera so those are going to

940

00:32:11,750 --> 00:32:09,240

talk to each other so that tracking

941

00:32:13,850 --> 00:32:11,760

camera it's actually it's um it's a

942

00:32:17,409 --> 00:32:13,860

security camera but you know we're using

943

00:32:20,930 --> 00:32:17,419

it for or not security purposes uh so

944

00:32:22,010 --> 00:32:20,940

exactly yeah exactly uh so if the

945

00:32:24,110 --> 00:32:22,020

infrared cameras see something

946

00:32:26,690 --> 00:32:24,120

interesting if our AI algorithms you

947

00:32:28,070 --> 00:32:26,700

know say okay hey this thing is weird uh

948

00:32:29,450 --> 00:32:28,080

again the whole question of how do you

949

00:32:30,889 --> 00:32:29,460

determine what is weird comes up again

950

00:32:32,330 --> 00:32:30,899

that's something we have to revisit and

951  
00:32:34,970 --> 00:32:32,340  
talk about a lot

952  
00:32:37,190 --> 00:32:34,980  
um then the the camera is going to track

953  
00:32:38,750 --> 00:32:37,200  
point to it and then zoom in and try to

954  
00:32:40,490 --> 00:32:38,760  
get higher resolution then maybe our

955  
00:32:42,409 --> 00:32:40,500  
infrared cameras would

956  
00:32:46,430 --> 00:32:42,419  
um let's see what else we have a

957  
00:32:49,250 --> 00:32:46,440  
spectrum analyzer we have a magnetometer

958  
00:32:51,110 --> 00:32:49,260  
we also have we're working on a passive

959  
00:32:53,450 --> 00:32:51,120  
radar solution because we can't have the

960  
00:32:54,350 --> 00:32:53,460  
beautiful radar that you guys have and

961  
00:32:57,070 --> 00:32:54,360  
the reason we're trying to do that

962  
00:33:00,409 --> 00:32:57,080  
passively is so that we can more easily

963  
00:33:02,750 --> 00:33:00,419

set up our system and not influence you

964

00:33:05,330 --> 00:33:02,760

know areas around us it's hard if you're

965

00:33:06,529 --> 00:33:05,340

emitting radio signals that's uh it's

966

00:33:08,810 --> 00:33:06,539

very hard to get approval and everything

967

00:33:10,610 --> 00:33:08,820

for that yeah exactly so if you're

968

00:33:13,070 --> 00:33:10,620

passive you're just sitting there

969

00:33:14,630 --> 00:33:13,080

so it's it's you know that technology is

970

00:33:17,210 --> 00:33:14,640

really cool but it's still developing so

971

00:33:19,070 --> 00:33:17,220

uh very early stages of that but I think

972

00:33:20,389 --> 00:33:19,080

oh we also have a weather station that's

973

00:33:22,009 --> 00:33:20,399

really important because you need to

974

00:33:23,509 --> 00:33:22,019

monitor atmosphere conditions because we

975

00:33:25,610 --> 00:33:23,519

don't know these phenomena could also be

976

00:33:27,169 --> 00:33:25,620

related to weather as well so I think

977

00:33:28,730 --> 00:33:27,179

we're just trying to do everything you

978

00:33:30,110 --> 00:33:28,740

know making no assumptions about what's

979

00:33:31,310 --> 00:33:30,120

already out there

980

00:33:33,769 --> 00:33:31,320

um which it's pretty hard because

981

00:33:35,570 --> 00:33:33,779

usually the way science is done is that

982

00:33:37,549 --> 00:33:35,580

you maybe have a hypothesis or some kind

983

00:33:38,990 --> 00:33:37,559

of ideas that are you know maybe gently

984

00:33:40,250 --> 00:33:39,000

guiding you to a solution you're like

985

00:33:41,690 --> 00:33:40,260

okay well I know I have to work within

986

00:33:42,950 --> 00:33:41,700

this framework or try to answer these

987

00:33:45,169 --> 00:33:42,960

questions

988

00:33:47,509 --> 00:33:45,179

um but we don't really have anything to

989

00:33:50,210 --> 00:33:47,519

go off of at least from a scientific

990

00:33:53,210 --> 00:33:50,220

point you know a big a big thing was you

991

00:33:55,130 --> 00:33:53,220

know do we take into account uh people

992

00:33:57,289 --> 00:33:55,140

like witness accounts is that something

993

00:33:59,630 --> 00:33:57,299

we can use scientifically to justify why

994

00:34:01,789 --> 00:33:59,640

we're going to this place or why we have

995

00:34:04,430 --> 00:34:01,799

this instrument or that instrument so it

996

00:34:05,990 --> 00:34:04,440

gets kind of sticky it's hard to uh to

997

00:34:07,250 --> 00:34:06,000

do it because then it's like you don't

998

00:34:08,050 --> 00:34:07,260

want to ignore the witness accounts

999

00:34:11,089 --> 00:34:08,060

either

1000

00:34:12,950 --> 00:34:11,099

but you know trying to to set the

1001  
00:34:14,750 --> 00:34:12,960  
standard for what the science approach

1002  
00:34:15,950 --> 00:34:14,760  
scientific approach for UAP is like is

1003  
00:34:17,930 --> 00:34:15,960  
you know not something that's super

1004  
00:34:19,909 --> 00:34:17,940  
trivial so I think just casting a wide

1005  
00:34:22,190 --> 00:34:19,919  
net letting letting the data speak for

1006  
00:34:23,389 --> 00:34:22,200  
itself and you know telling us what's

1007  
00:34:25,609 --> 00:34:23,399  
interesting and what's not interesting

1008  
00:34:28,310 --> 00:34:25,619  
that that's interesting too is like if

1009  
00:34:31,129 --> 00:34:28,320  
if the audio and cameras are going off

1010  
00:34:32,990 --> 00:34:31,139  
crazy and again what is crazy I don't

1011  
00:34:35,030 --> 00:34:33,000  
know but if for some reason they're

1012  
00:34:37,190 --> 00:34:35,040  
finding signatures that are just bizarre

1013  
00:34:38,629 --> 00:34:37,200

but we go over maybe to our passive

1014

00:34:40,669 --> 00:34:38,639

radar or the magnetometer and things

1015

00:34:42,290 --> 00:34:40,679

look you know sound as can be that's

1016

00:34:43,730 --> 00:34:42,300

also interesting because you know we

1017

00:34:46,129 --> 00:34:43,740

might have some kind of phenomena there

1018

00:34:48,530 --> 00:34:46,139

as well so that's my long answer to your

1019

00:34:52,190 --> 00:34:48,540

question does science work like that in

1020

00:34:56,089 --> 00:34:52,200

other fields or in other examples

1021

00:34:58,310 --> 00:34:56,099

I don't know if I know I think I guess

1022

00:35:01,130 --> 00:34:58,320

thinking about like computer science I

1023

00:35:03,410 --> 00:35:01,140

think uh with AI the whole point of AI

1024

00:35:05,150 --> 00:35:03,420

is to you know not have humans make

1025

00:35:06,410 --> 00:35:05,160

assumptions but have the computer kind

1026  
00:35:08,150 --> 00:35:06,420  
of make them and that's definitely what

1027  
00:35:09,650 --> 00:35:08,160  
we're relying on in our systems to

1028  
00:35:11,150 --> 00:35:09,660  
determine like what is weird it's like

1029  
00:35:12,950 --> 00:35:11,160  
well we humans shouldn't shouldn't be

1030  
00:35:15,109 --> 00:35:12,960  
involved in that we're heavily biased

1031  
00:35:16,849 --> 00:35:15,119  
but computer systems you know they do a

1032  
00:35:18,950 --> 00:35:16,859  
better job at you know you know

1033  
00:35:20,870 --> 00:35:18,960  
clustering things and and grouping

1034  
00:35:22,910 --> 00:35:20,880  
things and and just determining outliers

1035  
00:35:25,190 --> 00:35:22,920  
so I I would say you know in statistics

1036  
00:35:27,290 --> 00:35:25,200  
of course you always are looking at data

1037  
00:35:30,530 --> 00:35:27,300  
sets and determining outliers so in that

1038  
00:35:33,650 --> 00:35:30,540

sense I think maybe it's similar but the

1039

00:35:35,569 --> 00:35:33,660

whole approach of you know having to uh

1040

00:35:37,609 --> 00:35:35,579

yeah if you only have witness a callus I

1041

00:35:39,050 --> 00:35:37,619

can't really think of any other science

1042

00:35:40,730 --> 00:35:39,060

maybe where it's like that but there's

1043

00:35:42,470 --> 00:35:40,740

probably something I wonder if you could

1044

00:35:43,910 --> 00:35:42,480

yeah if you had a large enough data set

1045

00:35:45,230 --> 00:35:43,920

you know perhaps

1046

00:35:50,329 --> 00:35:45,240

pull out

1047

00:35:52,370 --> 00:35:50,339

learning that was consistent across all

1048

00:35:54,770 --> 00:35:52,380

the cases that other mods might not be

1049

00:35:56,990 --> 00:35:54,780

detected yeah yeah do you think that's

1050

00:35:59,089 --> 00:35:57,000

happening or is that happening

1051  
00:36:00,829 --> 00:35:59,099  
um do you know if that's happening uh in

1052  
00:36:03,530 --> 00:36:00,839  
The Wider astronomy field for Signal

1053  
00:36:05,089 --> 00:36:03,540  
detection uh within the data sets that

1054  
00:36:07,609 --> 00:36:05,099  
we're receiving I'll say from further

1055  
00:36:10,910 --> 00:36:09,290  
I think that'd be a question I wish I

1056  
00:36:12,290 --> 00:36:10,920  
knew more about like the study Institute

1057  
00:36:14,990 --> 00:36:12,300  
for instance because I know like they're

1058  
00:36:17,510 --> 00:36:15,000  
looking at techno signatures and I'm

1059  
00:36:18,829 --> 00:36:17,520  
sure they have you know things that

1060  
00:36:20,870 --> 00:36:18,839  
they're using to determine you know if

1061  
00:36:22,250 --> 00:36:20,880  
something is worth looking into more uh

1062  
00:36:23,930 --> 00:36:22,260  
but yeah I don't really know enough to

1063  
00:36:26,210 --> 00:36:23,940

1063  
speak about it one of the one of the

1064

00:36:28,310 --> 00:36:26,220

reasons I ask you that is because

1065

00:36:30,349 --> 00:36:28,320

um I think I've read some articles about

1066

00:36:33,050 --> 00:36:30,359

that of course the further away you get

1067

00:36:34,849 --> 00:36:33,060

from Earth it seems uh or from us the

1068

00:36:36,950 --> 00:36:34,859

more comfortable we are looking

1069

00:36:39,349 --> 00:36:36,960

for life elsewhere the more

1070

00:36:42,950 --> 00:36:39,359

scientifically acceptable it is

1071

00:36:46,849 --> 00:36:45,109

I don't know

1072

00:36:48,050 --> 00:36:46,859

I would love to read those papers if you

1073

00:36:50,870 --> 00:36:48,060

remember what they are I don't think

1074

00:36:52,790 --> 00:36:50,880

I've come across them but yeah uh

1075

00:36:54,530 --> 00:36:52,800

yeah I mean I think like the universe is

1076  
00:36:57,410 --> 00:36:54,540  
really big so sometimes we have to look

1077  
00:36:59,569 --> 00:36:57,420  
really far to uh to try to see other

1078  
00:37:01,370 --> 00:36:59,579  
systems that are like ours

1079  
00:37:04,010 --> 00:37:01,380  
um

1080  
00:37:06,650 --> 00:37:04,020  
but yeah it is interesting because the

1081  
00:37:08,270 --> 00:37:06,660  
the way kind of like light works so when

1082  
00:37:11,329 --> 00:37:08,280  
you're looking farther away you're also

1083  
00:37:13,550 --> 00:37:11,339  
looking further back into time uh

1084  
00:37:16,130 --> 00:37:13,560  
because you know for non-sides people

1085  
00:37:18,650 --> 00:37:16,140  
listening or watching

1086  
00:37:21,050 --> 00:37:18,660  
um light has to travel so if you're

1087  
00:37:22,430 --> 00:37:21,060  
looking farther away that means that the

1088  
00:37:24,290 --> 00:37:22,440

light is going to take more time to get

1089

00:37:26,329 --> 00:37:24,300

to you so as you look further and

1090

00:37:28,490 --> 00:37:26,339

further away you're like seeing that

1091

00:37:30,230 --> 00:37:28,500

light well when the Light reaches you

1092

00:37:32,210 --> 00:37:30,240

you know that's there was some time that

1093

00:37:34,250 --> 00:37:32,220

had to pass when it was being sent so

1094

00:37:36,349 --> 00:37:34,260

it's like I think you see this in a lot

1095

00:37:38,270 --> 00:37:36,359

of James Webb you know imagery you see

1096

00:37:40,190 --> 00:37:38,280

like really red galaxies so that's

1097

00:37:41,870 --> 00:37:40,200

something called a redshift so um the

1098

00:37:43,790 --> 00:37:41,880

universe is also expanding so when that

1099

00:37:45,349 --> 00:37:43,800

light is traveling the universe is

1100

00:37:48,109 --> 00:37:45,359

expanding it's shifting to better

1101

00:37:50,089 --> 00:37:48,119

wavelengths which are longer wavelengths

1102

00:37:53,329 --> 00:37:50,099

and because that's to cover more space

1103

00:37:57,050 --> 00:37:53,339

so it's that whole uh play of you know

1104

00:37:59,089 --> 00:37:57,060

space and time but uh yeah I forget your

1105

00:38:01,190 --> 00:37:59,099

original question okay I do that all the

1106

00:38:03,109 --> 00:38:01,200

time uh but really you know

1107

00:38:05,089 --> 00:38:03,119

we have the seti and steady looks out

1108

00:38:07,730 --> 00:38:05,099

and looks for distant radio waves and

1109

00:38:08,990 --> 00:38:07,740

you know maybe that just feels safer to

1110

00:38:10,069 --> 00:38:09,000

us to think that we can look out there

1111

00:38:11,750 --> 00:38:10,079

and if we find something it's not

1112

00:38:13,130 --> 00:38:11,760

immediately threatening yeah okay I

1113

00:38:14,150 --> 00:38:13,140

think I understand your question look at

1114

00:38:15,950 --> 00:38:14,160

Mars and it's like maybe there's

1115

00:38:17,930 --> 00:38:15,960

microbes there right and yeah that's not

1116

00:38:19,730 --> 00:38:17,940

very interesting yeah but then when we

1117

00:38:21,349 --> 00:38:19,740

consider if there's something in our sky

1118

00:38:23,210 --> 00:38:21,359

that theoretically could potentially be

1119

00:38:25,550 --> 00:38:23,220

from elsewhere that's a much more scary

1120

00:38:27,349 --> 00:38:25,560

thought so yeah and also it's scary to

1121

00:38:28,430 --> 00:38:27,359

think about if there's or at least I

1122

00:38:29,630 --> 00:38:28,440

would say it's scary I don't know if

1123

00:38:31,790 --> 00:38:29,640

everyone else would maybe they think

1124

00:38:33,530 --> 00:38:31,800

it's cool uh there's other civilizations

1125

00:38:36,109 --> 00:38:33,540

that are more technologically advanced

1126

00:38:37,730 --> 00:38:36,119

than we are I think that also you know

1127

00:38:39,470 --> 00:38:37,740

is playing into that whole idea of again

1128

00:38:41,750 --> 00:38:39,480

like paradigms

1129

00:38:44,030 --> 00:38:41,760

um if you are seeing signatures you know

1130

00:38:46,370 --> 00:38:44,040

maybe but I guess they signatures can be

1131

00:38:48,650 --> 00:38:46,380

threatening words hurt too but it's like

1132

00:38:50,150 --> 00:38:48,660

do they speak the same language like

1133

00:38:51,890 --> 00:38:50,160

probably not like how do they

1134

00:38:53,990 --> 00:38:51,900

communicate so

1135

00:38:55,069 --> 00:38:54,000

um but yeah no I do I do think it's just

1136

00:38:57,410 --> 00:38:55,079

like

1137

00:38:58,849 --> 00:38:57,420

again it's all it's also been hard

1138

00:39:00,829 --> 00:38:58,859

because everything

1139

00:39:03,650 --> 00:39:00,839

that you know like your detectors and

1140

00:39:05,030 --> 00:39:03,660

everything that you have used or seen

1141

00:39:07,130 --> 00:39:05,040

with you know other fighter pilots

1142

00:39:09,290 --> 00:39:07,140

that's all like classified and we're

1143

00:39:10,730 --> 00:39:09,300

getting kind of these bits from you know

1144

00:39:12,589 --> 00:39:10,740

the government reports that are coming

1145

00:39:14,210 --> 00:39:12,599

out but it's not enough for us to like

1146

00:39:16,310 --> 00:39:14,220

actually scientifically evaluate you

1147

00:39:19,069 --> 00:39:16,320

know the situation so we kind of have to

1148

00:39:20,930 --> 00:39:19,079

take our own our own data to figure that

1149

00:39:23,210 --> 00:39:20,940

part out

1150

00:39:24,109 --> 00:39:23,220

and you know I know that can that leads

1151

00:39:27,470 --> 00:39:24,119

to

1152

00:39:29,390 --> 00:39:27,480

and say this is still an initial

1153

00:39:31,670 --> 00:39:29,400

nonsense or try to you know discourage

1154

00:39:33,530 --> 00:39:31,680

you perhaps from uh engaging in this

1155

00:39:35,870 --> 00:39:33,540

field so you know as you were

1156

00:39:38,569 --> 00:39:35,880

considering kind of engaging in the

1157

00:39:39,589 --> 00:39:38,579

Galileo project I mean you know you said

1158

00:39:40,910 --> 00:39:39,599

you didn't really necessarily know what

1159

00:39:42,650 --> 00:39:40,920

you're getting into but now here you are

1160

00:39:43,910 --> 00:39:42,660

you know all my podcast talking about it

1161

00:39:46,190 --> 00:39:43,920

so

1162

00:39:48,109 --> 00:39:46,200

um what has been you know you made a

1163

00:39:50,510 --> 00:39:48,119

decision to kind of kind of lean into

1164

00:39:52,370 --> 00:39:50,520

this a bit yeah um

1165

00:39:54,109 --> 00:39:52,380

did anyone have any conversations with

1166

00:39:55,550 --> 00:39:54,119

you and discuss you know potentially

1167

00:39:57,890 --> 00:39:55,560

what the implications of that could be

1168

00:40:00,349 --> 00:39:57,900

or was there any pushback where your

1169

00:40:02,270 --> 00:40:00,359

experience is kind of diving into this

1170

00:40:03,710 --> 00:40:02,280

yeah and I think that's something I'd

1171

00:40:07,130 --> 00:40:03,720

love to talk about because I'm sure now

1172

00:40:08,450 --> 00:40:07,140

as you know more people are coming into

1173

00:40:10,609 --> 00:40:08,460

this field it's something they may be

1174

00:40:12,109 --> 00:40:10,619

thinking about or or considering you

1175

00:40:14,270 --> 00:40:12,119

know as reasons for them not to get

1176

00:40:15,950 --> 00:40:14,280

involved I don't think I ever received

1177

00:40:17,150 --> 00:40:15,960

any like official warnings or you know

1178

00:40:19,310 --> 00:40:17,160

anything

1179

00:40:21,650 --> 00:40:19,320

um but it was just kind of unspoken like

1180

00:40:24,050 --> 00:40:21,660

okay uh I guess I should say so I was

1181

00:40:25,609 --> 00:40:24,060

doing the independent study and then

1182

00:40:27,470 --> 00:40:25,619

um that same you know professors

1183

00:40:29,210 --> 00:40:27,480

Professor West Waters asked you know

1184

00:40:30,890 --> 00:40:29,220

what I like to do with Summer research

1185

00:40:32,630 --> 00:40:30,900

with the Galileo project you know

1186

00:40:34,609 --> 00:40:32,640

working on instrumentation so switching

1187

00:40:37,130 --> 00:40:34,619

branches but still under the same

1188

00:40:39,170 --> 00:40:37,140

umbrella and you know at that point I

1189

00:40:43,010 --> 00:40:39,180

had you know full intentions of applying

1190

00:40:44,390 --> 00:40:43,020

to grad school that next year so I was

1191

00:40:47,089 --> 00:40:44,400

just thinking you know I mean I did

1192

00:40:49,370 --> 00:40:47,099

think about it I was thinking okay

1193

00:40:52,670 --> 00:40:49,380

is my involvement how's this how's my

1194

00:40:54,650 --> 00:40:52,680

involvement going to be received from

1195

00:40:57,770 --> 00:40:54,660

people who are maybe viewing my

1196

00:41:00,770 --> 00:40:57,780

application for grad school

1197

00:41:02,270 --> 00:41:00,780

um and I definitely had to take take a

1198

00:41:03,950 --> 00:41:02,280

little bit of time to you know think

1199

00:41:06,589 --> 00:41:03,960

about that and you know weigh pros and

1200

00:41:09,770 --> 00:41:06,599

cons because I think it'd be silly to

1201

00:41:11,990 --> 00:41:09,780

say like oh I don't care it'll be fine

1202

00:41:14,750 --> 00:41:12,000

but if you kind of make this decision

1203

00:41:16,670 --> 00:41:14,760

you might be uh affected for your career

1204

00:41:19,550 --> 00:41:16,680

or at least that's that's what I was

1205

00:41:22,310 --> 00:41:19,560

telling myself but eventually I I was

1206

00:41:24,290 --> 00:41:22,320

looking at the project and you know my

1207

00:41:26,690 --> 00:41:24,300

experiences up until then had been no

1208

00:41:28,550 --> 00:41:26,700

different than any other research

1209

00:41:30,470 --> 00:41:28,560

astronomy research experiences like the

1210

00:41:32,510 --> 00:41:30,480

previous summer I was at Cornell working

1211

00:41:34,870 --> 00:41:32,520

on instrumentation for that's going to

1212

00:41:37,670 --> 00:41:34,880

look at it's a cosmology instrumentation

1213

00:41:39,650 --> 00:41:37,680

so it didn't feel the atmosphere didn't

1214

00:41:41,089 --> 00:41:39,660

feel any different than that so I was

1215

00:41:43,430 --> 00:41:41,099

like okay well as long as I can explain

1216

00:41:46,010 --> 00:41:43,440

myself and you know the things that I'm

1217

00:41:49,550 --> 00:41:46,020

doing are very fundamental they're

1218

00:41:51,770 --> 00:41:49,560

scientific I'm I'm developing skills in

1219

00:41:54,770 --> 00:41:51,780

Hardware coding debugging all of that

1220

00:41:56,390 --> 00:41:54,780

and that's going to be really helpful

1221

00:41:58,130 --> 00:41:56,400

um so I just kind of thought okay it's

1222

00:42:01,790 --> 00:41:58,140

going to be about frame gaming

1223

00:42:03,710 --> 00:42:01,800

moving forward but also if I'm applying

1224

00:42:06,170 --> 00:42:03,720

to these institutions and they're going

1225

00:42:07,849 --> 00:42:06,180

to judge me for engaging in this topic

1226

00:42:09,589 --> 00:42:07,859

even though it's with the proper

1227

00:42:11,450 --> 00:42:09,599

methodology or a great methodology

1228

00:42:13,670 --> 00:42:11,460

that's probably not a place I want to be

1229

00:42:16,250 --> 00:42:13,680

anyway so I'll go ahead and let them

1230

00:42:18,470 --> 00:42:16,260

filter themselves out because I don't I

1231

00:42:20,589 --> 00:42:18,480

don't want to go to a place and and be

1232

00:42:22,790 --> 00:42:20,599

surrounded by people who are not

1233

00:42:24,230 --> 00:42:22,800

encouraging of you know scientific

1234

00:42:26,690 --> 00:42:24,240

processes because again it's like

1235

00:42:30,530 --> 00:42:26,700

nothing that we're doing is is maybe

1236

00:42:33,470 --> 00:42:30,540

different in terms of our like our

1237

00:42:36,349 --> 00:42:33,480

science goals you know we follow all the

1238

00:42:37,609 --> 00:42:36,359

same processes that you would if you

1239

00:42:39,170 --> 00:42:37,619

were working on another scientific

1240

00:42:40,790 --> 00:42:39,180

project because just the application is

1241

00:42:41,810 --> 00:42:40,800

a little different yeah the application

1242

00:42:44,690 --> 00:42:41,820

is a little different the target's

1243

00:42:46,069 --> 00:42:44,700

different but you know who cares so

1244

00:42:48,050 --> 00:42:46,079

that's kind of I just was like you know

1245

00:42:49,910 --> 00:42:48,060

I'm going to lean into it

1246

00:42:52,910 --> 00:42:49,920

um and you know I I really I've never

1247

00:42:54,589 --> 00:42:52,920

received any pushback we were speaking a

1248

00:42:56,510 --> 00:42:54,599

little earlier I applied to grad school

1249

00:42:58,490 --> 00:42:56,520

I've been admitted to you know multiple

1250

00:43:00,829 --> 00:42:58,500

places so it seems like it it's it's

1251

00:43:02,569 --> 00:43:00,839

been well received and

1252

00:43:05,150 --> 00:43:02,579

um I think that fear I had in my head

1253

00:43:06,410 --> 00:43:05,160

was totally like self-fabricated and I

1254

00:43:08,329 --> 00:43:06,420

think the people that maybe do think

1255

00:43:11,030 --> 00:43:08,339

that way maybe they just stay quiet

1256

00:43:12,950 --> 00:43:11,040

which uh you know that's fine but I

1257

00:43:14,990 --> 00:43:12,960

really do think that over time it's

1258

00:43:17,329 --> 00:43:15,000

going to change a lot I mean just like

1259

00:43:18,890 --> 00:43:17,339

talking about it to my friends uh and

1260

00:43:20,630 --> 00:43:18,900

family like they're all just so excited

1261

00:43:22,550 --> 00:43:20,640

to hear about what's going on and you

1262

00:43:25,970 --> 00:43:22,560

know I've been really able to bond with

1263

00:43:28,490 --> 00:43:25,980

a lot of my family members like my um my

1264

00:43:31,069 --> 00:43:28,500

grandfather or my great-grandfather was

1265

00:43:34,010 --> 00:43:31,079

worked on planes in World War II

1266

00:43:35,150 --> 00:43:34,020

um so uh like I feel like in some ways

1267

00:43:37,130 --> 00:43:35,160

I'm kind of

1268

00:43:38,270 --> 00:43:37,140

you know engaging with that side of my

1269

00:43:39,530 --> 00:43:38,280

family and you know they've been

1270

00:43:40,790 --> 00:43:39,540

interested in the topic for reasons

1271

00:43:43,849 --> 00:43:40,800

because I think it kind of started out

1272

00:43:46,430 --> 00:43:43,859

in like a military kind of perspective

1273

00:43:48,650 --> 00:43:46,440

and it's cool about the military person

1274

00:43:51,589 --> 00:43:48,660

or LED UAP kind of topic it's like

1275

00:43:53,390 --> 00:43:51,599

that's where they started having these

1276

00:43:56,210 --> 00:43:53,400

uh where they started kind of maybe

1277

00:43:58,430 --> 00:43:56,220

collecting science or collecting data

1278

00:44:00,410 --> 00:43:58,440

about these objects because before that

1279

00:44:02,270 --> 00:44:00,420

I think it had mostly been witness

1280

00:44:04,130 --> 00:44:02,280

accounts so that's kind of the first

1281

00:44:06,349 --> 00:44:04,140

time where they were like it's weird

1282

00:44:08,870 --> 00:44:06,359

because our instruments said that they

1283

00:44:09,890 --> 00:44:08,880

were kind of strange so in some ways

1284

00:44:12,230 --> 00:44:09,900

like I'm talking into like my

1285

00:44:14,510 --> 00:44:12,240

grandfather who also you know was was a

1286

00:44:15,890 --> 00:44:14,520

pilot and I think like talking to him

1287

00:44:17,630 --> 00:44:15,900

has been has been awesome you know he's

1288

00:44:20,870 --> 00:44:17,640

just fascinated by it

1289

00:44:23,990 --> 00:44:20,880

um has he seen anything no no I wish I

1290

00:44:25,910 --> 00:44:24,000

wish I had stories but no I don't have

1291

00:44:28,670 --> 00:44:25,920

any but I think it's just the idea of it

1292

00:44:31,130 --> 00:44:28,680

uh and they're just really excited that

1293

00:44:31,970 --> 00:44:31,140

you know I I think the other point I'll

1294

00:44:34,490 --> 00:44:31,980

make

1295

00:44:37,550 --> 00:44:34,500

is that I think one of the reasons that

1296

00:44:39,290 --> 00:44:37,560

the Galileo project has you know gone to

1297

00:44:43,550 --> 00:44:39,300

where it is now is because of that

1298

00:44:45,349 --> 00:44:43,560

Harvard name that's attached to it so I

1299

00:44:47,450 --> 00:44:45,359

think that has helped give it

1300

00:44:49,190 --> 00:44:47,460

credibility

1301

00:44:51,650 --> 00:44:49,200

um which you know might not have had if

1302

00:44:53,450 --> 00:44:51,660

it was another institution unfortunately

1303

00:44:55,069 --> 00:44:53,460

so I definitely when I was like telling

1304

00:44:56,630 --> 00:44:55,079

people about my job I would definitely

1305

00:44:58,550 --> 00:44:56,640

lean into that first like oh I'm doing

1306

00:45:00,109 --> 00:44:58,560

research at Harvard and I'd be like okay

1307

00:45:01,730 --> 00:45:00,119

maybe they'll ask what I'm doing oh I'm

1308

00:45:06,050 --> 00:45:01,740

doing instrumentation

1309

00:45:07,550 --> 00:45:06,060

oh uh instrumentation yeah for UAV so I

1310

00:45:09,410 --> 00:45:07,560

definitely like kind of had I would

1311

00:45:11,150 --> 00:45:09,420

approach that in layers for probably the

1312

00:45:12,770 --> 00:45:11,160

first couple of weeks I was working and

1313

00:45:15,050 --> 00:45:12,780

then like I said I just decided you know

1314

00:45:16,970 --> 00:45:15,060

what I think this is worth speaking

1315

00:45:19,250 --> 00:45:16,980

about and I kind of just gained

1316

00:45:20,990 --> 00:45:19,260

confidence in that in the mission and I

1317

00:45:24,050 --> 00:45:21,000

was like okay we're just gonna lead with

1318

00:45:25,430 --> 00:45:24,060

that so anytime we're like out with and

1319

00:45:27,349 --> 00:45:25,440

I'm meeting new people or acquaintances

1320

00:45:29,990 --> 00:45:27,359

and I'm with people for instance like my

1321

00:45:31,130 --> 00:45:30,000

roommates who know what I do uh and you

1322

00:45:32,450 --> 00:45:31,140

know people come over they're like oh

1323

00:45:33,530 --> 00:45:32,460

yeah what do you do for work and we all

1324

00:45:35,930 --> 00:45:33,540

just kind of look at each other and

1325

00:45:38,150 --> 00:45:35,940

smile because we know that my answer is

1326

00:45:39,650 --> 00:45:38,160

gonna kind of blow their mind so I've

1327

00:45:41,450 --> 00:45:39,660

just like leaned into that and it's it's

1328

00:45:43,490 --> 00:45:41,460

become like really fun and I think

1329

00:45:45,890 --> 00:45:43,500

that's one of the ways we can at least

1330

00:45:47,750 --> 00:45:45,900

as young people like bring this uh or

1331

00:45:50,089 --> 00:45:47,760

help this discussion is to just talk

1332

00:45:51,230 --> 00:45:50,099

about it more and you know do it in a

1333

00:45:53,210 --> 00:45:51,240

sense that isn't talking about Sci-Fi

1334

00:45:55,130 --> 00:45:53,220

movies but actually talking about like

1335

00:45:56,930 --> 00:45:55,140

you know people's jobs and and how

1336

00:45:59,270 --> 00:45:56,940

they're engaging with it into science

1337

00:46:01,010 --> 00:45:59,280

yeah it's incredible are you seeing that

1338

00:46:03,170 --> 00:46:01,020

your friends are much more open to the

1339

00:46:04,790 --> 00:46:03,180

topic yeah and I think again that kind

1340

00:46:07,609 --> 00:46:04,800

of plays into like with time I think

1341

00:46:10,430 --> 00:46:07,619

it'll it'll it'll change uh but yeah I

1342

00:46:12,290 --> 00:46:10,440

haven't ever to my face at least I've

1343

00:46:15,230 --> 00:46:12,300

received any pushback from friends it's

1344

00:46:17,930 --> 00:46:15,240

all been like genuine interest that's

1345

00:46:20,150 --> 00:46:17,940

very cool yeah among authors

1346

00:46:23,930 --> 00:46:20,160

um do you think that this is a field or

1347

00:46:26,569 --> 00:46:23,940

topic you're gonna continue to pursue or

1348

00:46:28,190 --> 00:46:26,579

actually I'll just stop and say that

1349

00:46:30,190 --> 00:46:28,200

that's a million dollar question and Avi

1350

00:46:33,290 --> 00:46:30,200

wants to know that answer too

1351

00:46:37,069 --> 00:46:33,300

uh yeah no I think like

1352

00:46:39,770 --> 00:46:37,079

I don't think I ever want to cold turkey

1353

00:46:42,050 --> 00:46:39,780

quit my involvement

1354

00:46:45,950 --> 00:46:42,060

um but I am also interested in other

1355

00:46:47,210 --> 00:46:45,960

aspects of the universe so I think

1356

00:46:49,190 --> 00:46:47,220

I

1357

00:46:51,829 --> 00:46:49,200

it just kind of depends on on what

1358

00:46:53,690 --> 00:46:51,839

opportunities are out there again

1359

00:46:55,550 --> 00:46:53,700

I've kind of proven that maybe if you

1360

00:46:57,410 --> 00:46:55,560

work on this in undergrad it's not going

1361

00:46:58,910 --> 00:46:57,420

to follow me into grad school but then

1362

00:47:00,950 --> 00:46:58,920

you know that same question comes up

1363

00:47:02,930 --> 00:47:00,960

okay when I'm in grad school and I'm

1364

00:47:04,730 --> 00:47:02,940

applying for post-doctor I eventually

1365

00:47:06,349 --> 00:47:04,740

want to be a professor

1366

00:47:08,210 --> 00:47:06,359

um currently it's my single I'll

1367

00:47:09,950 --> 00:47:08,220

probably change in a few years no that's

1368

00:47:11,750 --> 00:47:09,960

that's for it now but then it's like

1369

00:47:14,270 --> 00:47:11,760

okay well that if I do it in grad school

1370

00:47:16,250 --> 00:47:14,280

that follow me there so it's something I

1371

00:47:17,870 --> 00:47:16,260

have to think about but you know there's

1372

00:47:19,430 --> 00:47:17,880

so many great mentors in the project

1373

00:47:21,410 --> 00:47:19,440

that I've been able to kind of have

1374

00:47:23,270 --> 00:47:21,420

these conversations with especially when

1375

00:47:24,950 --> 00:47:23,280

I was applying just like how do I word

1376

00:47:27,470 --> 00:47:24,960

things or whatever and they they really

1377

00:47:30,290 --> 00:47:27,480

helped me uh with that and you know lean

1378

00:47:31,609 --> 00:47:30,300

into the science aspect of it uh so but

1379

00:47:34,670 --> 00:47:31,619

you know I

1380

00:47:38,569 --> 00:47:34,680

I can't help uh

1381

00:47:41,089 --> 00:47:38,579

but want to continue doing the work in

1382

00:47:43,670 --> 00:47:41,099

some capacity so I think it'll just

1383

00:47:44,809 --> 00:47:43,680

depend on what can I write a thesis

1384

00:47:46,790 --> 00:47:44,819

about because that does kind of our

1385

00:47:49,730 --> 00:47:46,800

dissertation about yeah because it does

1386

00:47:52,609 --> 00:47:49,740

kind of have to be this uh packaged like

1387

00:47:54,170 --> 00:47:52,619

project that you do so but I'm keeping

1388

00:47:56,630 --> 00:47:54,180

the idea open I'm just trying to go into

1389

00:47:58,849 --> 00:47:56,640

it with an open mind and uh we'll see

1390

00:48:01,430 --> 00:47:58,859

we'll see what that leads me awesome

1391

00:48:03,530 --> 00:48:01,440

what would you recommend to

1392

00:48:05,630 --> 00:48:03,540

um people that were in your shoes a few

1393

00:48:07,190 --> 00:48:05,640

years ago that are you know making

1394

00:48:09,829 --> 00:48:07,200

decisions about where they want to go to

1395

00:48:11,630 --> 00:48:09,839

school or what they want to study you

1396

00:48:13,250 --> 00:48:11,640

know not saying you have to say you

1397

00:48:14,809 --> 00:48:13,260

should look into UAP or this but you

1398

00:48:17,030 --> 00:48:14,819

know you you basically stuck to your

1399

00:48:18,770 --> 00:48:17,040

guns and you know

1400

00:48:21,410 --> 00:48:18,780

had The Bravery to have this

1401  
00:48:23,390 --> 00:48:21,420  
conversation against you know the

1402  
00:48:25,550 --> 00:48:23,400  
popular culture and against

1403  
00:48:27,710 --> 00:48:25,560  
um the skepticism out there so

1404  
00:48:29,390 --> 00:48:27,720  
you know what advice or what would you

1405  
00:48:31,430 --> 00:48:29,400  
offer to anyone

1406  
00:48:35,390 --> 00:48:31,440  
um younger than you looking into this

1407  
00:48:37,490 --> 00:48:35,400  
and going into college yeah I have like

1408  
00:48:39,170 --> 00:48:37,500  
so much advice I feel like

1409  
00:48:40,250 --> 00:48:39,180  
so many things I would show you like you

1410  
00:48:41,569 --> 00:48:40,260  
know could have told myself I feel like

1411  
00:48:42,710 --> 00:48:41,579  
it's easier to speak to my younger self

1412  
00:48:44,210 --> 00:48:42,720  
so I'll do that and then if this

1413  
00:48:47,510 --> 00:48:44,220

resonates with anyone sure that's

1414

00:48:49,250 --> 00:48:47,520

amazing uh I would just say like explore

1415

00:48:50,569 --> 00:48:49,260

as much as you can even if you think you

1416

00:48:52,309 --> 00:48:50,579

know what you want to do just sign up

1417

00:48:55,250 --> 00:48:52,319

for that weird class sign up for

1418

00:48:57,710 --> 00:48:55,260

something fun uh that you might not have

1419

00:48:59,870 --> 00:48:57,720

you might not have any other chance to

1420

00:49:01,490 --> 00:48:59,880

engage with and if you like it even if

1421

00:49:05,569 --> 00:49:01,500

you're not great at it just keep trying

1422

00:49:08,150 --> 00:49:05,579

and keep pursuing it and

1423

00:49:10,370 --> 00:49:08,160

I think that's that's kind of what got

1424

00:49:12,530 --> 00:49:10,380

me into astronomy but even then when it

1425

00:49:14,870 --> 00:49:12,540

comes to like graduate school

1426

00:49:16,849 --> 00:49:14,880

um I think you know evaluate your goals

1427

00:49:18,589 --> 00:49:16,859

and if graduate school fits into them

1428

00:49:20,870 --> 00:49:18,599

that's awesome and and you should pursue

1429

00:49:23,150 --> 00:49:20,880

it but uh by no means you know not

1430

00:49:24,650 --> 00:49:23,160

everything needs to have a advanced

1431

00:49:26,390 --> 00:49:24,660

degree behind it so even if you know if

1432

00:49:27,829 --> 00:49:26,400

you don't want to go to college uh just

1433

00:49:30,589 --> 00:49:27,839

do find things that you're passionate

1434

00:49:34,010 --> 00:49:30,599

about and try to engage with them but

1435

00:49:35,930 --> 00:49:34,020

also you know acknowledge that

1436

00:49:39,650 --> 00:49:35,940

what your goals are and just try to work

1437

00:49:43,370 --> 00:49:39,660

towards them so I think uh

1438

00:49:44,930 --> 00:49:43,380

you know I wish I wish I could could go

1439

00:49:46,550 --> 00:49:44,940

back and tell myself where I am now

1440

00:49:47,809 --> 00:49:46,560

because I think I would just be utterly

1441

00:49:49,730 --> 00:49:47,819

shocked

1442

00:49:51,770 --> 00:49:49,740

um little Ryan Bishop yeah exactly I'm

1443

00:49:53,809 --> 00:49:51,780

like when I was eight I wanted to be on

1444

00:49:55,790 --> 00:49:53,819

Broadway you can have like I don't want

1445

00:49:57,530 --> 00:49:55,800

that anymore uh but I think that's okay

1446

00:49:59,089 --> 00:49:57,540

you know it's okay to like change what

1447

00:50:00,589 --> 00:49:59,099

you want to do and it's okay to change

1448

00:50:03,109 --> 00:50:00,599

your mind

1449

00:50:05,750 --> 00:50:03,119

um and it's okay to you know maybe do

1450

00:50:07,670 --> 00:50:05,760

work that not everyone in your family or

1451  
00:50:10,670 --> 00:50:07,680  
in your circle maybe like it's gonna

1452  
00:50:12,890 --> 00:50:10,680  
approve of obviously you know

1453  
00:50:14,210 --> 00:50:12,900  
you should check in with people and make

1454  
00:50:17,329 --> 00:50:14,220  
sure that you know it's not like

1455  
00:50:18,950 --> 00:50:17,339  
anything too wild but there are some

1456  
00:50:20,270 --> 00:50:18,960  
boundaries there there are boundaries

1457  
00:50:21,770 --> 00:50:20,280  
but you know when it comes to topics

1458  
00:50:24,589 --> 00:50:21,780  
like this that

1459  
00:50:26,930 --> 00:50:24,599  
um have ridicule like look into why that

1460  
00:50:29,450 --> 00:50:26,940  
ridicule is there in the first place and

1461  
00:50:32,030 --> 00:50:29,460  
don't you know read a bunch of Articles

1462  
00:50:34,130 --> 00:50:32,040  
and just conglomerate their opinions

1463  
00:50:37,250 --> 00:50:34,140

together uh really think about like what

1464

00:50:39,290 --> 00:50:37,260

your belief system is so I think

1465

00:50:41,210 --> 00:50:39,300

that is really important not worrying

1466

00:50:42,589 --> 00:50:41,220

about how people are going to perceive

1467

00:50:44,569 --> 00:50:42,599

it if you're passionate about something

1468

00:50:46,730 --> 00:50:44,579

frame it in a way that is going to be

1469

00:50:48,950 --> 00:50:46,740

acceptable to others and if it's not

1470

00:50:50,450 --> 00:50:48,960

acceptable to them maybe take that as a

1471

00:50:53,329 --> 00:50:50,460

sign that that's not somewhere where you

1472

00:50:56,150 --> 00:50:53,339

want to be anyway that's great advice

1473

00:50:57,950 --> 00:50:56,160

awesome so where is the Galileo project

1474

00:50:59,569 --> 00:50:57,960

today you know I they're they're

1475

00:51:01,549 --> 00:50:59,579

building centers You're Building sensors

1476

00:51:03,109 --> 00:51:01,559

you have a couple different types a big

1477

00:51:05,089 --> 00:51:03,119

expensive one and you're working to

1478

00:51:06,470 --> 00:51:05,099

bring the cost down and make them more

1479

00:51:08,450 --> 00:51:06,480

scalable

1480

00:51:10,730 --> 00:51:08,460

um have you guys started like making

1481

00:51:12,290 --> 00:51:10,740

what I call it production detections or

1482

00:51:14,150 --> 00:51:12,300

are you still kind of in a testing phase

1483

00:51:15,470 --> 00:51:14,160

right now yeah so I would say you know

1484

00:51:17,210 --> 00:51:15,480

straight up we're definitely in the

1485

00:51:19,549 --> 00:51:17,220

testing phase right now uh but that's

1486

00:51:21,049 --> 00:51:19,559

the most important phase so uh the

1487

00:51:23,150 --> 00:51:21,059

terminology we've been using is we're in

1488

00:51:25,490 --> 00:51:23,160

phase one so we have this our first

1489

00:51:27,589 --> 00:51:25,500

Observatory system we had it installed

1490

00:51:29,809 --> 00:51:27,599

on top of the Harvard College

1491

00:51:31,190 --> 00:51:29,819

Observatory route for a while uh we're

1492

00:51:32,809 --> 00:51:31,200

just you know testing that everything

1493

00:51:34,250 --> 00:51:32,819

like the hardware is behaving as we're

1494

00:51:35,930 --> 00:51:34,260

expecting

1495

00:51:38,270 --> 00:51:35,940

um and then we were able to move to

1496

00:51:39,890 --> 00:51:38,280

another instrument site which uh

1497

00:51:41,890 --> 00:51:39,900

I'm not allowed to say where it's

1498

00:51:44,569 --> 00:51:41,900

classified classified

1499

00:51:46,730 --> 00:51:44,579

but that is where we can you know do a

1500

00:51:48,950 --> 00:51:46,740

little bit more rigorous testing

1501  
00:51:51,890 --> 00:51:48,960  
um but yeah so definitely just like

1502  
00:51:53,809 --> 00:51:51,900  
making sure things are are running you

1503  
00:51:57,109 --> 00:51:53,819  
know sometimes you need to go out there

1504  
00:51:58,250 --> 00:51:57,119  
and uh unplug some USB cables and

1505  
00:52:00,950 --> 00:51:58,260  
replugging them in so we have to

1506  
00:52:03,109 --> 00:52:00,960  
troubleshoot like why did that happen uh

1507  
00:52:04,430 --> 00:52:03,119  
and thinking about you know what that

1508  
00:52:06,290 --> 00:52:04,440  
says in terms of our technology

1509  
00:52:07,670 --> 00:52:06,300  
capability how hands off is it how

1510  
00:52:09,170 --> 00:52:07,680  
Hands-On is it so just determining all

1511  
00:52:11,510 --> 00:52:09,180  
those things is really important in the

1512  
00:52:13,250 --> 00:52:11,520  
space one uh but also you know we have a

1513  
00:52:15,650 --> 00:52:13,260

science traceability Matrix that says

1514

00:52:16,849 --> 00:52:15,660

all of our goals uh you know areas where

1515

00:52:18,349 --> 00:52:16,859

we want to make sure these instruments

1516

00:52:20,750 --> 00:52:18,359

are performing up to their

1517

00:52:22,670 --> 00:52:20,760

specifications so just referring back to

1518

00:52:24,410 --> 00:52:22,680

that always which that'll be in our

1519

00:52:26,990 --> 00:52:24,420

paper better our papers that are coming

1520

00:52:28,549 --> 00:52:27,000

out uh but just referring back to that

1521

00:52:31,549 --> 00:52:28,559

and making sure okay we said we wanted

1522

00:52:32,690 --> 00:52:31,559

to get this resolution of objects uh we

1523

00:52:34,790 --> 00:52:32,700

wouldn't be able to see objects moving

1524

00:52:35,990 --> 00:52:34,800

like this fast or this far away uh just

1525

00:52:37,730 --> 00:52:36,000

making sure that we're actually seeing

1526

00:52:39,049 --> 00:52:37,740

that so and you define all those

1527

00:52:41,450 --> 00:52:39,059

parameters and some of your upcoming

1528

00:52:42,650 --> 00:52:41,460

papers exactly so those are very you

1529

00:52:44,030 --> 00:52:42,660

know they're detail and they're lined

1530

00:52:46,430 --> 00:52:44,040

out just like they would for any other

1531

00:52:48,530 --> 00:52:46,440

you know scientific project so I think

1532

00:52:50,510 --> 00:52:48,540

that is really important so we've kind

1533

00:52:52,430 --> 00:52:50,520

of put a pause

1534

00:52:55,790 --> 00:52:52,440

um or not put a pause we've just kind of

1535

00:52:58,069 --> 00:52:55,800

taken this opportunity to now that

1536

00:53:00,530 --> 00:52:58,079

things are kind of going to make sure

1537

00:53:03,710 --> 00:53:00,540

we're doing the preliminary analysis and

1538

00:53:05,630 --> 00:53:03,720

again performing up to spec so uh that

1539

00:53:07,790 --> 00:53:05,640

involves a lot of observing birds and

1540

00:53:09,470 --> 00:53:07,800

planes for right now but I mean we have

1541

00:53:12,230 --> 00:53:09,480

the cameras rolling so if anything

1542

00:53:14,210 --> 00:53:12,240

decides to give us a visit I guess we'll

1543

00:53:16,069 --> 00:53:14,220

have it but it just you know

1544

00:53:17,930 --> 00:53:16,079

the like like we were kind of speaking

1545

00:53:19,730 --> 00:53:17,940

about a little bit uh how you determine

1546

00:53:22,190 --> 00:53:19,740

that something is weird or anomalous

1547

00:53:25,370 --> 00:53:22,200

we're gonna let the like the AI

1548

00:53:27,230 --> 00:53:25,380

algorithms handle that for us so in

1549

00:53:29,569 --> 00:53:27,240

order for those you know algorithms to

1550

00:53:31,849 --> 00:53:29,579

operate they need to have collect large

1551

00:53:34,370 --> 00:53:31,859

amounts of data first so they need to

1552

00:53:37,370 --> 00:53:34,380

see a ton of planes and a ton of birds

1553

00:53:39,109 --> 00:53:37,380

and a ton of insects uh just and so that

1554

00:53:40,970 --> 00:53:39,119

they can cluster them together in groups

1555

00:53:42,530 --> 00:53:40,980

and then once that clustering starts to

1556

00:53:43,790 --> 00:53:42,540

happen you can kind of see okay maybe

1557

00:53:46,730 --> 00:53:43,800

there's a couple points that are just

1558

00:53:48,410 --> 00:53:46,740

hanging out over here let's go and see

1559

00:53:50,770 --> 00:53:48,420

what those are about and then that's

1560

00:53:53,089 --> 00:53:50,780

where you know we maybe start to

1561

00:53:55,190 --> 00:53:53,099

go into what we would say like anomaly

1562

00:53:57,109 --> 00:53:55,200

detection so it'll be definitely like a

1563

00:53:58,849 --> 00:53:57,119

continuous process but I I would say

1564

00:54:00,770 --> 00:53:58,859

we're we're definitely in like the

1565

00:54:02,750 --> 00:54:00,780

testing phase right now uh but you know

1566

00:54:05,450 --> 00:54:02,760

taking all this into consideration and

1567

00:54:08,329 --> 00:54:05,460

we're hoping soon uh you know I think

1568

00:54:11,510 --> 00:54:08,339

our our goal right now is by August

1569

00:54:13,370 --> 00:54:11,520

where we uh where we kind of started the

1570

00:54:14,630 --> 00:54:13,380

papers the introductory papers outlining

1571

00:54:16,670 --> 00:54:14,640

like the hardware of the system and the

1572

00:54:18,829 --> 00:54:16,680

goals last year uh to kind of have our

1573

00:54:20,630 --> 00:54:18,839

first round of paper is about like data

1574

00:54:22,609 --> 00:54:20,640

and our interpretation and methodologies

1575

00:54:26,089 --> 00:54:22,619

there so definitely stay tuned for that

1576

00:54:28,490 --> 00:54:26,099

uh less than 2024 the fall yeah so I

1577

00:54:30,109 --> 00:54:28,500

guess depends on on what results what

1578

00:54:32,089 --> 00:54:30,119

journals we submit to and what their

1579

00:54:33,770 --> 00:54:32,099

processes are like for feedback and then

1580

00:54:35,809 --> 00:54:33,780

how long they take to publish but I

1581

00:54:37,190 --> 00:54:35,819

would say hopefully

1582

00:54:38,450 --> 00:54:37,200

um so it'll be like what batch paper

1583

00:54:40,609 --> 00:54:38,460

will come out and then a year later

1584

00:54:43,250 --> 00:54:40,619

they'll be supplemented with more gotta

1585

00:54:45,410 --> 00:54:43,260

sell yeah so the papers I don't think

1586

00:54:47,990 --> 00:54:45,420

are necessarily part of phase one but uh

1587

00:54:50,270 --> 00:54:48,000

that kind of validation and testing that

1588

00:54:52,790 --> 00:54:50,280

you talked about is phase one is phase

1589

00:54:54,829 --> 00:54:52,800

two more of just kind of the the data

1590

00:54:56,329 --> 00:54:54,839

collection and waiting to catch

1591

00:54:58,010 --> 00:54:56,339

something or is that what phase two

1592

00:55:00,829 --> 00:54:58,020

would be yeah so I should clarify I

1593

00:55:02,329 --> 00:55:00,839

guess phase one is is more uh the phases

1594

00:55:04,970 --> 00:55:02,339

is more in reference to like what

1595

00:55:07,069 --> 00:55:04,980

Hardware reason so phase one includes

1596

00:55:08,450 --> 00:55:07,079

like the whole process of Designing and

1597

00:55:09,589 --> 00:55:08,460

whatever so all of our papers that are

1598

00:55:11,990 --> 00:55:09,599

coming out are about our phase one

1599

00:55:13,609 --> 00:55:12,000

instrumentation got it so it's outlining

1600

00:55:14,390 --> 00:55:13,619

you know Hardware what we're using all

1601  
00:55:18,770 --> 00:55:14,400  
that

1602  
00:55:20,210 --> 00:55:18,780  
this and and for you know good science

1603  
00:55:22,790 --> 00:55:20,220  
studies you want to make sure that your

1604  
00:55:24,290 --> 00:55:22,800  
studies are uh able to be replicated so

1605  
00:55:26,150 --> 00:55:24,300  
we want to outline all the details so

1606  
00:55:28,309 --> 00:55:26,160  
that if someone another group or another

1607  
00:55:30,349 --> 00:55:28,319  
University would pick up our paper

1608  
00:55:32,450 --> 00:55:30,359  
follow everything exactly they would

1609  
00:55:33,589 --> 00:55:32,460  
hope to get you know the same results

1610  
00:55:36,349 --> 00:55:33,599  
that we're getting that's the whole

1611  
00:55:37,430 --> 00:55:36,359  
point of of these papers is to outline

1612  
00:55:40,309 --> 00:55:37,440  
you know what we're doing being

1613  
00:55:40,970 --> 00:55:40,319

transparent about it as much as we can

1614

00:55:43,910 --> 00:55:40,980

um

1615

00:55:45,410 --> 00:55:43,920

and yeah so that's kind of phase one and

1616

00:55:48,950 --> 00:55:45,420

then we're kind of thinking about okay

1617

00:55:50,510 --> 00:55:48,960

like phase 1.5 maybe we replace so for

1618

00:55:53,089 --> 00:55:50,520

instance one thing we're talking about

1619

00:55:54,589 --> 00:55:53,099

now is we have um

1620

00:55:55,670 --> 00:55:54,599

this dollar camera which I was talking

1621

00:55:57,710 --> 00:55:55,680

about earlier which is made up of

1622

00:56:00,349 --> 00:55:57,720

infrared cameras you know is it better

1623

00:56:02,569 --> 00:56:00,359

to have one big one or two smaller ones

1624

00:56:03,770 --> 00:56:02,579

based apart so things like that you just

1625

00:56:06,589 --> 00:56:03,780

have to test and kind of see what

1626  
00:56:08,569 --> 00:56:06,599  
happens and you can you know calculate

1627  
00:56:09,589 --> 00:56:08,579  
Theory and everything all day but it

1628  
00:56:10,790 --> 00:56:09,599  
really comes down to you know when

1629  
00:56:12,349 --> 00:56:10,800  
you're out there when you're gonna what

1630  
00:56:14,270 --> 00:56:12,359  
are you what are you getting on what can

1631  
00:56:17,210 --> 00:56:14,280  
you do so you know just making sure our

1632  
00:56:19,069 --> 00:56:17,220  
pipelines are running smoothly and that

1633  
00:56:22,069 --> 00:56:19,079  
the hardware is behaving expected expect

1634  
00:56:24,890 --> 00:56:22,079  
as expected is is you know the highlight

1635  
00:56:28,069 --> 00:56:24,900  
of phase one but for phase two you know

1636  
00:56:28,670 --> 00:56:28,079  
that's adding a couple uh instruments so

1637  
00:56:30,710 --> 00:56:28,680  
um

1638  
00:56:33,290 --> 00:56:30,720

I guess I spoke uh

1639

00:56:34,790 --> 00:56:33,300

spoke excitedly the magnetometer isn't

1640

00:56:35,750 --> 00:56:34,800

technically part of our our phase one

1641

00:56:38,450 --> 00:56:35,760

yet

1642

00:56:40,130 --> 00:56:38,460

um but something I work on so I

1643

00:56:41,569 --> 00:56:40,140

it's in the works so it's almost like

1644

00:56:43,010 --> 00:56:41,579

phase one through five it's almost like

1645

00:56:45,170 --> 00:56:43,020

in the middle but like that and then

1646

00:56:47,089 --> 00:56:45,180

we're adding a spectrometer uh so it's

1647

00:56:50,329 --> 00:56:47,099

just a couple things that are you know a

1648

00:56:51,770 --> 00:56:50,339

little bit further uh further ahead so

1649

00:56:53,750 --> 00:56:51,780

that's like kind of phase two will be

1650

00:56:55,970 --> 00:56:53,760

like an upgrade to our systems or

1651  
00:56:58,370 --> 00:56:55,980  
thinking about you know again technology

1652  
00:57:00,890 --> 00:56:58,380  
is is always improving I'm talking about

1653  
00:57:02,390 --> 00:57:00,900  
those infrared cameras well that same

1654  
00:57:04,490 --> 00:57:02,400  
company just came out with a plus

1655  
00:57:06,290 --> 00:57:04,500  
version it's more expensive but it has

1656  
00:57:08,450 --> 00:57:06,300  
been a resolution and all this so it's

1657  
00:57:09,890 --> 00:57:08,460  
like okay well you know where do where

1658  
00:57:11,089 --> 00:57:09,900  
do our limits lie do we need something

1659  
00:57:12,710 --> 00:57:11,099  
that's better do we not need something

1660  
00:57:14,390 --> 00:57:12,720  
that's better so it's just a lot of

1661  
00:57:16,370 --> 00:57:14,400  
those like little questions to answer

1662  
00:57:18,290 --> 00:57:16,380  
right now so so things are progressing

1663  
00:57:19,970 --> 00:57:18,300

as expected yeah people shouldn't be

1664

00:57:21,829 --> 00:57:19,980

waiting for some massive announcement

1665

00:57:23,270 --> 00:57:21,839

tomorrow or anything yeah exactly no

1666

00:57:24,849 --> 00:57:23,280

it'll take it'll take a while to get

1667

00:57:27,650 --> 00:57:24,859

there just like I said because you know

1668

00:57:29,510 --> 00:57:27,660

we are trying to do this very rigorously

1669

00:57:30,710 --> 00:57:29,520

and and scientifically so even if we see

1670

00:57:33,349 --> 00:57:30,720

something that doesn't quite make sense

1671

00:57:34,849 --> 00:57:33,359

uh we're gonna wait for our AI algorithm

1672

00:57:36,650 --> 00:57:34,859

to tell us that not just with our eyes

1673

00:57:39,950 --> 00:57:36,660

wait for the scientific process that

1674

00:57:41,329 --> 00:57:39,960

yeah exactly and then making sure uh you

1675

00:57:44,089 --> 00:57:41,339

know we're referencing all the other

1676

00:57:47,390 --> 00:57:44,099

instruments uh you know like we saw like

1677

00:57:48,650 --> 00:57:47,400

a uh a bird fly by that was like in a

1678

00:57:50,089 --> 00:57:48,660

weird trajectory and we were like oh

1679

00:57:51,410 --> 00:57:50,099

that's so cool and exciting but it's

1680

00:57:53,030 --> 00:57:51,420

like oh yeah we can see it's bird

1681

00:57:56,030 --> 00:57:53,040

because here it's a bird you know so it

1682

00:57:59,270 --> 00:57:56,040

uh it humbles you very much yeah and you

1683

00:58:01,970 --> 00:57:59,280

know separating that I think uh you know

1684

00:58:03,950 --> 00:58:01,980

not everyone on the team is is you know

1685

00:58:05,630 --> 00:58:03,960

believing in the same outcome right you

1686

00:58:07,730 --> 00:58:05,640

know there there are some like I guess

1687

00:58:09,109 --> 00:58:07,740

you would say like non-believers

1688

00:58:10,490 --> 00:58:09,119

um which I think is important to have on

1689

00:58:11,750 --> 00:58:10,500

a project like this to make sure you

1690

00:58:13,430 --> 00:58:11,760

know you're doing it right and you're

1691

00:58:16,130 --> 00:58:13,440

incorporating everyone's opinions and

1692

00:58:17,390 --> 00:58:16,140

viewpoints in into the uh approach and

1693

00:58:21,890 --> 00:58:17,400

discussion

1694

00:58:23,210 --> 00:58:21,900

but uh I mean I guess I would say I just

1695

00:58:26,750 --> 00:58:23,220

hope that

1696

00:58:28,370 --> 00:58:26,760

find because I don't know but I just

1697

00:58:30,470 --> 00:58:28,380

hope that this sets a standard that you

1698

00:58:32,870 --> 00:58:30,480

can do science that is looking into

1699

00:58:34,609 --> 00:58:32,880

phenomena whatever that phenomena may be

1700

00:58:36,049 --> 00:58:34,619

awesome well I'm really happy you're

1701

00:58:37,970 --> 00:58:36,059

looking into it and you're taking an

1702

00:58:39,770 --> 00:58:37,980

interest in it thanks yeah I mean thank

1703

00:58:40,789 --> 00:58:39,780

you for you know bringing this to light

1704

00:58:43,430 --> 00:58:40,799

and obviously it would have never

1705

00:58:45,770 --> 00:58:43,440

happened without you know the brave The

1706

00:58:47,450 --> 00:58:45,780

Bravery of many people who have had

1707

00:58:49,849 --> 00:58:47,460

experiences and witness accounts coming

1708

00:58:51,410 --> 00:58:49,859

forward and and really fighting for this

1709

00:58:53,930 --> 00:58:51,420

to get the attention I think it deserves

1710

00:58:56,790 --> 00:58:53,940

so awesome well we'll be watching and