



Ask An Astrobiologist



EPISODE 49: JUNE 16TH, 2022

REV. DR. LUCAS MIX



Astrobiology Program

1
00:00:30,070 --> 00:00:08,790

[Music]

2
00:00:35,670 --> 00:00:33,270

greetings friends fellow earthlings and

3
00:00:37,670 --> 00:00:35,680

luminaries in the human journey

4
00:00:39,670 --> 00:00:37,680

welcome to ask an astrobiologist the

5
00:00:41,990 --> 00:00:39,680

show that celebrates the science

6
00:00:43,830 --> 00:00:42,000

and celebrates the scientists involved

7
00:00:44,790 --> 00:00:43,840

in our quest to understand the nature of

8
00:00:47,270 --> 00:00:44,800

life

9
00:00:49,590 --> 00:00:47,280

i'm your host dr graham the cosmo

10
00:00:52,029 --> 00:00:49,600

biologist lao and we are brought to you

11
00:00:53,670 --> 00:00:52,039

by the nasa astrobiology program and

12
00:00:55,270 --> 00:00:53,680

saginet.org

13
00:00:57,029 --> 00:00:55,280

as always we want to thank all of you

14

00:00:59,349 --> 00:00:57,039

who are out there watching our show

15

00:01:01,670 --> 00:00:59,359

right now live on youtube and asking

16

00:01:03,590 --> 00:01:01,680

questions for our guest in the chat all

17

00:01:05,189 --> 00:01:03,600

of you who tune in to our show after the

18

00:01:06,630 --> 00:01:05,199

recording is posted on youtube and all

19

00:01:07,710 --> 00:01:06,640

of you who ask questions using the

20

00:01:10,310 --> 00:01:07,720

hashtag

21

00:01:12,230 --> 00:01:10,320

askastrobio on twitter this month we'd

22

00:01:15,190 --> 00:01:12,240

like to give a special shout out to dr

23

00:01:16,789 --> 00:01:15,200

jim pass a longtime viewer of the show

24

00:01:19,749 --> 00:01:16,799

who's also the founder and director of

25

00:01:22,149 --> 00:01:19,759

the astro sociology research institute

26

00:01:24,630 --> 00:01:22,159

dr pass always brings really intriguing

27

00:01:26,469 --> 00:01:24,640

questions to our show and for our guests

28

00:01:28,870 --> 00:01:26,479

in the realm of sociology and other

29

00:01:31,109 --> 00:01:28,880

humanities which are also a very crucial

30

00:01:32,630 --> 00:01:31,119

part of this quest that we all share in

31

00:01:33,830 --> 00:01:32,640

better understanding our place in the

32

00:01:35,270 --> 00:01:33,840

cosmos

33

00:01:38,310 --> 00:01:35,280

and that's actually kind of fitting with

34

00:01:40,069 --> 00:01:38,320

what we're speaking about this month uh

35

00:01:41,990 --> 00:01:40,079

this month we'd like to we're going to

36

00:01:44,870 --> 00:01:42,000

be talking with a guest who has a

37

00:01:47,510 --> 00:01:44,880

background not just in science but also

38

00:01:50,230 --> 00:01:47,520

in theology as well as history in some

39

00:01:53,429 --> 00:01:50,240

other realms we titled this episode

40

00:01:55,109 --> 00:01:53,439

exploring outer space and the inner self

41

00:01:58,149 --> 00:01:55,119

because we have joining us the reverend

42

00:02:00,630 --> 00:01:58,159

dr lucas mix who studies life concepts

43

00:02:02,389 --> 00:02:00,640

across disciplines and wonders what is

44

00:02:04,310 --> 00:02:02,399

it about life that makes us look for

45

00:02:06,069 --> 00:02:04,320

more of it in space

46

00:02:08,150 --> 00:02:06,079

he is the ninth bloomberg chair of

47

00:02:10,150 --> 00:02:08,160

astrobiology at the library of congress

48

00:02:12,229 --> 00:02:10,160

he holds a doctorate in evolutionary

49

00:02:13,670 --> 00:02:12,239

theory and he works to facilitate

50

00:02:15,350 --> 00:02:13,680

science engagement with religious

51
00:02:17,750 --> 00:02:15,360
leaders so welcome to ask an

52
00:02:20,229 --> 00:02:17,760
astrobiologist dr mix

53
00:02:21,990 --> 00:02:20,239
ah wonderful to be here

54
00:02:23,589 --> 00:02:22,000
yes i'm so glad you could join us i'm so

55
00:02:25,110 --> 00:02:23,599
glad to finally have you on the show

56
00:02:26,390 --> 00:02:25,120
i've been thinking about you for a very

57
00:02:28,150 --> 00:02:26,400
long time and how cool it would be to

58
00:02:30,229 --> 00:02:28,160
have you given your background and your

59
00:02:31,750 --> 00:02:30,239
expertise and now that you've been a

60
00:02:33,670 --> 00:02:31,760
chair of astrobiology the library of

61
00:02:34,869 --> 00:02:33,680
congress that the timing just felt very

62
00:02:37,430 --> 00:02:34,879
right to have you

63
00:02:38,790 --> 00:02:37,440

on the show um so before i get to get

64

00:02:40,470 --> 00:02:38,800

started here kind of going into what

65

00:02:41,589 --> 00:02:40,480

you're currently up to and and some of

66

00:02:43,750 --> 00:02:41,599

the things you've been doing in your

67

00:02:45,670 --> 00:02:43,760

career for all of our guests i always

68

00:02:47,670 --> 00:02:45,680

like to ask them about their science

69

00:02:48,949 --> 00:02:47,680

origin story what got them into becoming

70

00:02:50,949 --> 00:02:48,959

researchers

71

00:02:52,390 --> 00:02:50,959

but with you i want to actually ask what

72

00:02:55,030 --> 00:02:52,400

were the trajectories for you and not

73

00:02:56,630 --> 00:02:55,040

just science but also theology do you

74

00:02:58,710 --> 00:02:56,640

have an origin story that kind of

75

00:03:01,910 --> 00:02:58,720

culminated to bring you forward to

76

00:03:05,430 --> 00:03:01,920

finding this kind of dual career

77

00:03:08,229 --> 00:03:05,440

i do i i find this i love this question

78

00:03:10,949 --> 00:03:08,239

just because i get so enthusiastic about

79

00:03:12,710 --> 00:03:10,959

the meaning of life uh and taking that

80

00:03:15,350 --> 00:03:12,720

from various angles

81

00:03:18,149 --> 00:03:15,360

so when i was in high school there was a

82

00:03:19,830 --> 00:03:18,159

great genetics program and that really

83

00:03:21,750 --> 00:03:19,840

got me enthused

84

00:03:23,750 --> 00:03:21,760

about how i could do biology without

85

00:03:25,990 --> 00:03:23,760

making a mess

86

00:03:28,869 --> 00:03:26,000

and i i really liked this idea of you

87

00:03:30,149 --> 00:03:28,879

know the mathematical study of biology

88

00:03:32,390 --> 00:03:30,159

and

89

00:03:35,190 --> 00:03:32,400

i ended up going to the university of

90

00:03:39,350 --> 00:03:35,200

washington and studying biochemistry and

91

00:03:41,110 --> 00:03:39,360

comparative religion at the same time

92

00:03:43,990 --> 00:03:41,120

when i was a

93

00:03:45,509 --> 00:03:44,000

junior i really wanted to go to the nasa

94

00:03:48,149 --> 00:03:45,519

academy

95

00:03:50,630 --> 00:03:48,159

which is a program for undergraduates

96

00:03:53,030 --> 00:03:50,640

and so i applied to that and i got this

97

00:03:55,670 --> 00:03:53,040

phone call out of the blue from jerry

98

00:03:56,789 --> 00:03:55,680

soffen who had been the project

99

00:03:59,509 --> 00:03:56,799

scientist

100

00:04:01,509 --> 00:03:59,519

for the viking missions

101
00:04:03,509 --> 00:04:01,519
and he was running outreach at goddard

102
00:04:05,830 --> 00:04:03,519
space center and he said no no no you

103
00:04:08,229 --> 00:04:05,840
don't want to do nasa academy you want

104
00:04:11,030 --> 00:04:08,239
to do a research program

105
00:04:12,309 --> 00:04:11,040
and so he talked me into

106
00:04:15,990 --> 00:04:12,319
the

107
00:04:18,629 --> 00:04:16,000
director student researcher program at

108
00:04:20,870 --> 00:04:18,639
at goddard space flight center

109
00:04:22,790 --> 00:04:20,880
where i was strangely enough doing uh

110
00:04:23,990 --> 00:04:22,800
thermal engineering

111
00:04:26,150 --> 00:04:24,000
um

112
00:04:27,909 --> 00:04:26,160
but uh it was just this great

113
00:04:28,870 --> 00:04:27,919

opportunity to talk with people and get

114

00:04:30,790 --> 00:04:28,880

involved

115

00:04:34,629 --> 00:04:30,800

and it happened that that year the

116

00:04:36,550 --> 00:04:34,639

martian meteorite alh 84006

117

00:04:39,749 --> 00:04:36,560

was discovered

118

00:04:41,430 --> 00:04:39,759

but

119

00:04:43,830 --> 00:04:41,440

it was announced

120

00:04:45,110 --> 00:04:43,840

that year that folks at johnson space

121

00:04:47,110 --> 00:04:45,120

center thought there was evidence of

122

00:04:48,230 --> 00:04:47,120

life in there so this

123

00:04:49,150 --> 00:04:48,240

really

124

00:04:51,670 --> 00:04:49,160

new

125

00:04:52,710 --> 00:04:51,680

enthusiasm for the question of life on

126
00:04:54,390 --> 00:04:52,720
mars

127
00:04:57,110 --> 00:04:54,400
developed right at that time that i was

128
00:04:58,950 --> 00:04:57,120
working for nasa um and i just got roped

129
00:05:00,870 --> 00:04:58,960
right in

130
00:05:02,550 --> 00:05:00,880
wow it's such cool timing so i was in

131
00:05:04,390 --> 00:05:02,560
the nasa academy it was a wonderful

132
00:05:06,550 --> 00:05:04,400
experience but i never had the benefit

133
00:05:09,270 --> 00:05:06,560
of meeting jerry sawfin um you know he

134
00:05:10,870 --> 00:05:09,280
passed away back then unfortunately

135
00:05:12,950 --> 00:05:10,880
and we lost him but i think for those

136
00:05:14,550 --> 00:05:12,960
watching jerry salfin was such an

137
00:05:16,710 --> 00:05:14,560
advocate for young people getting

138
00:05:19,270 --> 00:05:16,720

involved in science and space

139

00:05:20,950 --> 00:05:19,280

exploration and joining nasa uh we even

140

00:05:22,950 --> 00:05:20,960

have a travel grant for young students

141

00:05:24,629 --> 00:05:22,960

named after jerry salford and that those

142

00:05:26,790 --> 00:05:24,639

of us who are in the nasa academy we

143

00:05:28,070 --> 00:05:26,800

review the applications for that um

144

00:05:29,350 --> 00:05:28,080

that's very cool and it's so cool that

145

00:05:30,790 --> 00:05:29,360

you also mentioned that kind of that

146

00:05:34,150 --> 00:05:30,800

time in history when you were studying

147

00:05:37,189 --> 00:05:34,160

then and working for nasa in 1996 when

148

00:05:38,390 --> 00:05:37,199

alh 84001 was kind of announced i was a

149

00:05:40,629 --> 00:05:38,400

kid i remember

150

00:05:42,310 --> 00:05:40,639

bill clinton coming out on on the lawn

151

00:05:43,510 --> 00:05:42,320

of the white house and making this

152

00:05:45,749 --> 00:05:43,520

proclamation that we might have just

153

00:05:47,749 --> 00:05:45,759

made the biggest discovery of all of

154

00:05:51,189 --> 00:05:47,759

humanity and indeed the word

155

00:05:53,110 --> 00:05:51,199

astrobiology wasn't really used by nasa

156

00:05:55,350 --> 00:05:53,120

until that moment before that we called

157

00:05:57,909 --> 00:05:55,360

it exobiology and then it became

158

00:05:59,510 --> 00:05:57,919

astrobiology uh and so i love that that

159

00:06:01,830 --> 00:05:59,520

kind of was like your birthplace into

160

00:06:03,430 --> 00:06:01,840

this whole realm and so what kind of led

161

00:06:05,990 --> 00:06:03,440

you then to want to

162

00:06:08,870 --> 00:06:06,000

explore not just you know astrobiology

163

00:06:11,749 --> 00:06:08,880

but what's the other side of the coin

164

00:06:14,390 --> 00:06:11,759

yeah no so i i was really interested in

165

00:06:16,230 --> 00:06:14,400

uh in the big questions uh particularly

166

00:06:19,029 --> 00:06:16,240

this what is life

167

00:06:21,029 --> 00:06:19,039

and so i decided to go someplace for

168

00:06:22,469 --> 00:06:21,039

graduate school where i could study keep

169

00:06:24,070 --> 00:06:22,479

studying both

170

00:06:26,870 --> 00:06:24,080

i went to

171

00:06:28,309 --> 00:06:26,880

harvard which has really good theology

172

00:06:29,830 --> 00:06:28,319

program and

173

00:06:32,870 --> 00:06:29,840

i went there for

174

00:06:36,550 --> 00:06:32,880

organismic and evolutionary biology

175

00:06:38,870 --> 00:06:36,560

um and i had really intended to go into

176

00:06:41,189 --> 00:06:38,880

science for a while and be a a

177

00:06:43,749 --> 00:06:41,199

professional scientist but i found about

178

00:06:46,230 --> 00:06:43,759

halfway through graduate school that i

179

00:06:50,150 --> 00:06:46,240

spent all of my free time talking with

180

00:06:51,909 --> 00:06:50,160

scientists about god and uh and so i

181

00:06:53,749 --> 00:06:51,919

i really decided that it was important

182

00:06:56,230 --> 00:06:53,759

for me to go to seminary as soon as i

183

00:06:57,510 --> 00:06:56,240

got my doctorate i i wanted to finish

184

00:06:59,909 --> 00:06:57,520

and i was really a little bit worried

185

00:07:01,830 --> 00:06:59,919

about my my doctoral committee you know

186

00:07:03,350 --> 00:07:01,840

because they put all this work into me

187

00:07:05,270 --> 00:07:03,360

um and how would they feel about me

188

00:07:06,790 --> 00:07:05,280

going to seminary but they were very

189

00:07:08,390 --> 00:07:06,800

very supportive

190

00:07:10,469 --> 00:07:08,400

i am

191

00:07:12,950 --> 00:07:10,479

i just think we

192

00:07:14,629 --> 00:07:12,960

we're always doing this work of trying

193

00:07:16,870 --> 00:07:14,639

to place ourselves in the universe and

194

00:07:19,510 --> 00:07:16,880

that's not just a science question it's

195

00:07:20,790 --> 00:07:19,520

also an ethical question and a meaning

196

00:07:21,830 --> 00:07:20,800

question

197

00:07:24,710 --> 00:07:21,840

and so

198

00:07:27,749 --> 00:07:24,720

uh you know how do we do that that work

199

00:07:29,189 --> 00:07:27,759

of putting those things together

200

00:07:31,909 --> 00:07:29,199

and um

201
00:07:33,589 --> 00:07:31,919
that that led me on to you know try and

202
00:07:36,070 --> 00:07:33,599
try and keep both hats off at the same

203
00:07:38,309 --> 00:07:36,080
time i was a college chaplain for a year

204
00:07:40,710 --> 00:07:38,319
i was called chaplain for four years uh

205
00:07:41,830 --> 00:07:40,720
at the university of arizona uh and

206
00:07:44,710 --> 00:07:41,840
after that

207
00:07:45,510 --> 00:07:44,720
moved on to my current position

208
00:07:47,909 --> 00:07:45,520
which

209
00:07:49,430 --> 00:07:47,919
facilitates giving science information

210
00:07:51,749 --> 00:07:49,440
to church leaders

211
00:07:53,110 --> 00:07:51,759
that's fantastic i absolutely come back

212
00:07:54,390 --> 00:07:53,120
to the eclipse project and what you've

213
00:07:56,150 --> 00:07:54,400

been doing there

214

00:07:59,350 --> 00:07:56,160

but first a few things i want to bring

215

00:08:00,710 --> 00:07:59,360

out one for for younger people right now

216

00:08:03,270 --> 00:08:00,720

who want to learn more about

217

00:08:05,909 --> 00:08:03,280

astrobiology there's something really

218

00:08:07,589 --> 00:08:05,919

awesome right now in the works it's the

219

00:08:10,309 --> 00:08:07,599

third version of something called the

220

00:08:12,390 --> 00:08:10,319

astrobiology primer and the cool thing

221

00:08:14,869 --> 00:08:12,400

about the reverend dr lucas mix is he

222

00:08:16,950 --> 00:08:14,879

was the author of the very first

223

00:08:18,390 --> 00:08:16,960

astrobiology primer and the advocate for

224

00:08:20,150 --> 00:08:18,400

really bringing this together to have

225

00:08:22,150 --> 00:08:20,160

some source of knowledge that kind of

226

00:08:24,469 --> 00:08:22,160

allows us to understand many of the

227

00:08:26,710 --> 00:08:24,479

diverse topics and disciplines that come

228

00:08:28,629 --> 00:08:26,720

into astrobiology so i would just love

229

00:08:30,869 --> 00:08:28,639

to hear from you what was the birth of

230

00:08:32,630 --> 00:08:30,879

this idea of building the astrobiology

231

00:08:34,389 --> 00:08:32,640

primer and what was that like kind of

232

00:08:36,469 --> 00:08:34,399

being the progenitor of this really

233

00:08:38,709 --> 00:08:36,479

incredible thing that we all now in

234

00:08:41,670 --> 00:08:38,719

astrobiology have used

235

00:08:44,710 --> 00:08:41,680

yeah um so so graham mentioned that in

236

00:08:46,790 --> 00:08:44,720

96 was when when astrobiology

237

00:08:49,750 --> 00:08:46,800

in its sort of current incarnation came

238

00:08:52,790 --> 00:08:49,760

about it was called exobiology before

239

00:08:54,949 --> 00:08:52,800

that um and that came both from from the

240

00:08:57,670 --> 00:08:54,959

martian meteorite uh and the first

241

00:08:59,430 --> 00:08:57,680

discovery of extrasolar planets

242

00:09:02,070 --> 00:08:59,440

um and so we

243

00:09:04,150 --> 00:09:02,080

we started having conferences and i i

244

00:09:05,670 --> 00:09:04,160

think it was um

245

00:09:07,670 --> 00:09:05,680

i think it was in 2000 it might have

246

00:09:08,389 --> 00:09:07,680

been 2001. i was a young graduate

247

00:09:11,590 --> 00:09:08,399

student

248

00:09:13,509 --> 00:09:11,600

i didn't know any better and uh i i said

249

00:09:15,910 --> 00:09:13,519

you know we've got these biologists and

250

00:09:17,430 --> 00:09:15,920

these chemists and these geologists and

251
00:09:19,190 --> 00:09:17,440
astronomers and they don't all speak the

252
00:09:20,470 --> 00:09:19,200
same language so how do we how do we

253
00:09:22,630 --> 00:09:20,480
solve that

254
00:09:24,550 --> 00:09:22,640
maybe maybe we could just like assign

255
00:09:26,230 --> 00:09:24,560
reading to people maybe we could say you

256
00:09:28,550 --> 00:09:26,240
know here's this short document that

257
00:09:30,310 --> 00:09:28,560
introduces astrobiology

258
00:09:32,630 --> 00:09:30,320
and if you come to a conference on

259
00:09:34,870 --> 00:09:32,640
astrobiology you can expect people to

260
00:09:37,590 --> 00:09:34,880
have read it and anything that's not in

261
00:09:39,990 --> 00:09:37,600
there then you would have to explain uh

262
00:09:41,350 --> 00:09:40,000
because frequently you know for example

263
00:09:42,790 --> 00:09:41,360

the word terrestrial if you're a

264

00:09:45,269 --> 00:09:42,800

biologist

265

00:09:47,430 --> 00:09:45,279

means on land and not in the water

266

00:09:50,230 --> 00:09:47,440

and if you are an astronomer uh it means

267

00:09:52,470 --> 00:09:50,240

a rocky planet and not a gaseous planet

268

00:09:54,389 --> 00:09:52,480

um so so how do you see that everyone's

269

00:09:56,550 --> 00:09:54,399

using the same language

270

00:09:58,470 --> 00:09:56,560

and i uh i mentioned this to barry

271

00:10:01,269 --> 00:09:58,480

bloomberg who was the head of the nasa

272

00:10:03,269 --> 00:10:01,279

astrobiology institute and he said great

273

00:10:06,710 --> 00:10:03,279

you should write this

274

00:10:08,949 --> 00:10:06,720

and i was just completely overwhelmed

275

00:10:11,430 --> 00:10:08,959

i like to say that

276

00:10:13,509 --> 00:10:11,440

six years a hundred contributors 24

277

00:10:14,550 --> 00:10:13,519

authors eight editors

278

00:10:17,509 --> 00:10:14,560

later

279

00:10:19,590 --> 00:10:17,519

we came out with the first astrobiology

280

00:10:21,350 --> 00:10:19,600

primer a quick and dirty introduction to

281

00:10:22,710 --> 00:10:21,360

astrobiology

282

00:10:25,590 --> 00:10:22,720

and

283

00:10:28,150 --> 00:10:25,600

it was a blast i learned a lot we had

284

00:10:30,710 --> 00:10:28,160

great communication entirely written by

285

00:10:33,430 --> 00:10:30,720

early career scientists and it was such

286

00:10:35,030 --> 00:10:33,440

a success that we did version two uh in

287

00:10:38,069 --> 00:10:35,040

2016

288

00:10:40,470 --> 00:10:38,079

and version three is

289

00:10:42,310 --> 00:10:40,480

almost out we're we're just about to

290

00:10:44,389 --> 00:10:42,320

cross the finish line so that's very

291

00:10:45,509 --> 00:10:44,399

exciting i have i've handed on to some

292

00:10:46,470 --> 00:10:45,519

other folks

293

00:10:49,190 --> 00:10:46,480

um

294

00:10:51,910 --> 00:10:49,200

but i'm looking forward to reading it

295

00:10:53,750 --> 00:10:51,920

absolutely me too i i think one thing i

296

00:10:55,670 --> 00:10:53,760

commonly will tell early graduate

297

00:10:57,590 --> 00:10:55,680

students especially two of the best

298

00:11:00,150 --> 00:10:57,600

things you can do to learn more about

299

00:11:02,470 --> 00:11:00,160

the field of astrobiology is to read the

300

00:11:04,710 --> 00:11:02,480

astrobiology primer and to go to the

301

00:11:06,870 --> 00:11:04,720

astrobiology graduate conference because

302

00:11:08,790 --> 00:11:06,880

those two things will help you to learn

303

00:11:11,110 --> 00:11:08,800

what's going on in other disciplines

304

00:11:12,550 --> 00:11:11,120

within astrobiology as well and you

305

00:11:14,150 --> 00:11:12,560

mentioned barry blumberg there and i'd

306

00:11:16,790 --> 00:11:14,160

like to come back because now you've

307

00:11:20,069 --> 00:11:16,800

been the ninth barry blumberg chair of

308

00:11:21,829 --> 00:11:20,079

astrobiology at the library of congress

309

00:11:23,829 --> 00:11:21,839

and i unfortunately i missed your talk

310

00:11:25,829 --> 00:11:23,839

at the recent apps icon but i saw you

311

00:11:27,110 --> 00:11:25,839

give a talk at the recent social meeting

312

00:11:29,750 --> 00:11:27,120

which we can talk about in a little bit

313

00:11:32,150 --> 00:11:29,760

as well um but it's a really beautiful

314

00:11:34,150 --> 00:11:32,160

talk about ascension narratives in

315

00:11:36,630 --> 00:11:34,160

science and theology and in fiction

316

00:11:38,230 --> 00:11:36,640

writing i'd love to hear about your work

317

00:11:39,269 --> 00:11:38,240

at the library of congress and and how

318

00:11:41,269 --> 00:11:39,279

that culminates now and what you're

319

00:11:44,150 --> 00:11:41,279

currently working on

320

00:11:45,910 --> 00:11:44,160

awesome everything is connected i i feel

321

00:11:46,870 --> 00:11:45,920

like you know all of these stories tied

322

00:11:49,990 --> 00:11:46,880

together

323

00:11:55,269 --> 00:11:52,230

so so first of all the the bloomberg

324

00:11:57,269 --> 00:11:55,279

chair um at the library of congress is

325

00:12:00,310 --> 00:11:57,279

this opportunity to think about the

326

00:12:02,550 --> 00:12:00,320

societal implications of astrobiology

327

00:12:05,030 --> 00:12:02,560

and a lot of these these big picture

328

00:12:07,590 --> 00:12:05,040

questions that i'm interested in

329

00:12:09,750 --> 00:12:07,600

and i propose that i would go there and

330

00:12:11,509 --> 00:12:09,760

read through carl sagan's

331

00:12:13,350 --> 00:12:11,519

papers

332

00:12:16,550 --> 00:12:13,360

particularly he was interested in

333

00:12:19,910 --> 00:12:16,560

writing this book called ethos on ethics

334

00:12:21,910 --> 00:12:19,920

after his book's book on the cosmos

335

00:12:25,110 --> 00:12:21,920

and he never wrote that book but it just

336

00:12:26,629 --> 00:12:25,120

had some amazing insights and so

337

00:12:27,990 --> 00:12:26,639

that was one of the one of the reasons i

338

00:12:30,629 --> 00:12:28,000

was there

339

00:12:32,790 --> 00:12:30,639

my research has really come together as

340

00:12:34,230 --> 00:12:32,800

this discussion about

341

00:12:36,550 --> 00:12:34,240

planetary

342

00:12:39,110 --> 00:12:36,560

travel and stories we tell about

343

00:12:41,430 --> 00:12:39,120

planetary travel so there's this great

344

00:12:43,430 --> 00:12:41,440

quote from galileo who said

345

00:12:45,990 --> 00:12:43,440

the intention of the holy spirit is to

346

00:12:48,470 --> 00:12:46,000

tell us how the how to go to heaven and

347

00:12:51,030 --> 00:12:48,480

not how the heaven goes

348

00:12:54,069 --> 00:12:51,040

and this was galileo saying that the

349

00:12:55,350 --> 00:12:54,079

church should not be involved in

350

00:12:57,269 --> 00:12:55,360

astronomy

351

00:13:00,310 --> 00:12:57,279

and that scripture was doing things

352

00:13:01,910 --> 00:13:00,320

other than astronomy and those things

353

00:13:04,310 --> 00:13:01,920

were the important parts of scripture it

354

00:13:06,470 --> 00:13:04,320

was not knocking scripture but saying

355

00:13:08,949 --> 00:13:06,480

you know this is this is something with

356

00:13:12,470 --> 00:13:08,959

profound ethical significance um and we

357

00:13:14,550 --> 00:13:12,480

might focus there anyway i totally agree

358

00:13:15,829 --> 00:13:14,560

with galileo that the church should not

359

00:13:17,110 --> 00:13:15,839

be telling astronomers how to do

360

00:13:19,430 --> 00:13:17,120

astronomy

361

00:13:21,350 --> 00:13:19,440

but i also think that the way we talk

362

00:13:23,910 --> 00:13:21,360

about going to heaven and the way we

363

00:13:25,910 --> 00:13:23,920

talk about going to space

364

00:13:27,350 --> 00:13:25,920

have always been tied together in our

365

00:13:29,670 --> 00:13:27,360

imagination

366

00:13:30,470 --> 00:13:29,680

so i i traced the history of this looked

367

00:13:34,949 --> 00:13:30,480

at

368

00:13:37,190 --> 00:13:34,959

um really

369

00:13:38,790 --> 00:13:37,200

going back pretty early but um

370

00:13:40,710 --> 00:13:38,800

you know some 16th century science

371

00:13:42,550 --> 00:13:40,720

fiction all the way through carl sagan

372

00:13:44,550 --> 00:13:42,560

who was a great science fiction author

373

00:13:46,790 --> 00:13:44,560

uh as well as a great astronomer and

374

00:13:50,230 --> 00:13:46,800

astrobiologist

375

00:13:52,550 --> 00:13:50,240

and i think for me the big take-home

376

00:13:54,870 --> 00:13:52,560

was that we have this idea that there's

377

00:13:56,790 --> 00:13:54,880

there's higher and lower physical space

378

00:13:58,230 --> 00:13:56,800

which is pretty straightforward

379

00:14:01,750 --> 00:13:58,240

and there's

380

00:14:04,069 --> 00:14:01,760

higher and lower forms of life

381

00:14:05,990 --> 00:14:04,079

now all of us know what that means we

382

00:14:08,389 --> 00:14:06,000

think of ourselves as higher forms of

383

00:14:09,509 --> 00:14:08,399

life and other forms of life is lower

384

00:14:11,189 --> 00:14:09,519

than us

385

00:14:13,990 --> 00:14:11,199

um

386

00:14:16,550 --> 00:14:14,000

and then there's this idea of of higher

387

00:14:18,150 --> 00:14:16,560

and lower spiritual so we talk about

388

00:14:18,949 --> 00:14:18,160

jesus ascending

389

00:14:21,509 --> 00:14:18,959

um

390

00:14:23,990 --> 00:14:21,519

or you know going up to heaven why is it

391

00:14:26,870 --> 00:14:24,000

that we talk about as going up to heaven

392

00:14:28,829 --> 00:14:26,880

and historically we've always

393

00:14:32,230 --> 00:14:28,839

we have generally at least

394

00:14:33,430 --> 00:14:32,240

um in the west talked about those all

395

00:14:36,150 --> 00:14:33,440

together

396

00:14:39,750 --> 00:14:36,160

now as a biologist i would say well

397

00:14:40,629 --> 00:14:39,760

higher lower life really aren't things

398

00:14:43,590 --> 00:14:40,639

in

399

00:14:45,990 --> 00:14:43,600

biology we talk about

400

00:14:48,870 --> 00:14:46,000

the development of an individual who

401
00:14:49,990 --> 00:14:48,880
grows up along a a fixed path set by

402
00:14:51,829 --> 00:14:50,000
genes

403
00:14:55,189 --> 00:14:51,839
and we also talk about the evolution of

404
00:14:56,870 --> 00:14:55,199
a species and that doesn't go up it goes

405
00:15:01,030 --> 00:14:56,880
out

406
00:15:05,350 --> 00:15:01,040
diversification

407
00:15:08,870 --> 00:15:05,360
which is not always about a cent

408
00:15:11,350 --> 00:15:08,880
um and as most of you probably know uh

409
00:15:13,750 --> 00:15:11,360
copernicus reminded us that that we are

410
00:15:15,750 --> 00:15:13,760
not near the center

411
00:15:16,870 --> 00:15:15,760
of the cosmos

412
00:15:18,069 --> 00:15:16,880
um

413
00:15:20,150 --> 00:15:18,079

that uh

414

00:15:22,150 --> 00:15:20,160

you know this up and down in astronomy

415

00:15:24,629 --> 00:15:22,160

is relative as well

416

00:15:28,310 --> 00:15:24,639

so i i sort of wanted to unpack what it

417

00:15:31,189 --> 00:15:28,320

means when we talk about going up

418

00:15:33,350 --> 00:15:31,199

and ascent and it's probably not biology

419

00:15:34,629 --> 00:15:33,360

and it's probably not astronomy most of

420

00:15:36,710 --> 00:15:34,639

the time

421

00:15:39,110 --> 00:15:36,720

when we talk about growing up

422

00:15:40,629 --> 00:15:39,120

it's something ideological or spiritual

423

00:15:42,870 --> 00:15:40,639

and how do we figure out what we're

424

00:15:45,590 --> 00:15:42,880

bringing to that discussion in terms of

425

00:15:47,590 --> 00:15:45,600

what we think is is going up or growing

426

00:15:50,150 --> 00:15:47,600

up um

427

00:15:52,629 --> 00:15:50,160

and and what that means so

428

00:15:55,189 --> 00:15:52,639

should we go to space i think yes

429

00:15:57,350 --> 00:15:55,199

i'm a big fan of space travel and i'm a

430

00:15:59,990 --> 00:15:57,360

fan of space exploration so it's not

431

00:16:02,710 --> 00:16:00,000

because space is better than earth and

432

00:16:05,509 --> 00:16:02,720

it's not that we will leave earth behind

433

00:16:08,230 --> 00:16:05,519

which i think is a a very dangerous uh

434

00:16:10,310 --> 00:16:08,240

idea but it's an idea that when we go

435

00:16:13,189 --> 00:16:10,320

into space we are going out we are

436

00:16:16,389 --> 00:16:13,199

diversifying discovering strange new

437

00:16:17,749 --> 00:16:16,399

worlds uh and civilizations

438

00:16:20,069 --> 00:16:17,759

and uh

439

00:16:22,550 --> 00:16:20,079

so i'm very excited about that

440

00:16:24,790 --> 00:16:22,560

i uh i think we should be very careful

441

00:16:25,829 --> 00:16:24,800

because historically this idea

442

00:16:29,350 --> 00:16:25,839

that

443

00:16:32,150 --> 00:16:29,360

societies evolve towards

444

00:16:33,590 --> 00:16:32,160

you know some good future that there is

445

00:16:35,110 --> 00:16:33,600

um

446

00:16:37,829 --> 00:16:35,120

uh

447

00:16:40,710 --> 00:16:37,839

a development as a society

448

00:16:43,749 --> 00:16:40,720

it sort of lures us into thinking well

449

00:16:46,150 --> 00:16:43,759

if i know what a future society should

450

00:16:48,470 --> 00:16:46,160

like look like when it's grown up

451
00:16:50,949 --> 00:16:48,480
then i have an obligation to help it

452
00:16:53,990 --> 00:16:50,959
along the way

453
00:16:56,150 --> 00:16:54,000
and that starts getting really dangerous

454
00:16:58,790 --> 00:16:56,160
ethically really fast

455
00:17:01,350 --> 00:16:58,800
in terms of things like eugenics

456
00:17:02,829 --> 00:17:01,360
and and some civilizations deciding that

457
00:17:04,870 --> 00:17:02,839
they're better than other

458
00:17:06,470 --> 00:17:04,880
civilizations um it's generally called

459
00:17:09,189 --> 00:17:06,480
white man's burden

460
00:17:10,949 --> 00:17:09,199
uh this idea that that we know

461
00:17:13,669 --> 00:17:10,959
we're better so how do we think

462
00:17:15,110 --> 00:17:13,679
critically i am a priest and i do think

463
00:17:16,630 --> 00:17:15,120

there is a better i think there's a

464

00:17:18,710 --> 00:17:16,640

right way to go

465

00:17:21,350 --> 00:17:18,720

and i want to be clear that we're not

466

00:17:22,710 --> 00:17:21,360

getting that from biology or astronomy

467

00:17:24,390 --> 00:17:22,720

we don't need to get it from

468

00:17:26,150 --> 00:17:24,400

christianity

469

00:17:27,909 --> 00:17:26,160

but let's think about where we get it

470

00:17:29,270 --> 00:17:27,919

and let's talk together

471

00:17:31,190 --> 00:17:29,280

uh you know

472

00:17:33,510 --> 00:17:31,200

do we want to go to space why do we want

473

00:17:35,750 --> 00:17:33,520

to go to space what is it up there that

474

00:17:38,870 --> 00:17:35,760

we value and what are we

475

00:17:40,870 --> 00:17:38,880

leaving behind or not leaving behind

476
00:17:42,549 --> 00:17:40,880
that's so beautiful yeah and there's so

477
00:17:43,750 --> 00:17:42,559
much to unpack there

478
00:17:45,430 --> 00:17:43,760
i do want to say for our audience

479
00:17:47,750 --> 00:17:45,440
watching right now on youtube please

480
00:17:49,270 --> 00:17:47,760
keep asking your questions uh for lucas

481
00:17:50,630 --> 00:17:49,280
we will get to those as soon as we can i

482
00:17:53,430 --> 00:17:50,640
have my own questions though to ask

483
00:17:55,029 --> 00:17:53,440
first and i have a lot of them um i will

484
00:17:57,430 --> 00:17:55,039
uh we will have videos eventually from

485
00:17:59,350 --> 00:17:57,440
abs icon and social of lucas's talks and

486
00:18:01,270 --> 00:17:59,360
so you can learn more about these ideas

487
00:18:03,190 --> 00:18:01,280
of ascension narratives uh in our

488
00:18:05,270 --> 00:18:03,200

storytelling uh one thing we want to

489

00:18:08,390 --> 00:18:05,280

point out on the nasa astrobiology

490

00:18:10,710 --> 00:18:08,400

twitter account at nasa astro bio we

491

00:18:12,630 --> 00:18:10,720

asked the audience this week

492

00:18:14,950 --> 00:18:12,640

how they kind of prefer getting their

493

00:18:16,870 --> 00:18:14,960

stories about journey in the universe

494

00:18:18,710 --> 00:18:16,880

and exploring the universe and we gave

495

00:18:20,150 --> 00:18:18,720

them some options like books movies and

496

00:18:21,590 --> 00:18:20,160

podcasts

497

00:18:22,950 --> 00:18:21,600

others could have included things like

498

00:18:25,669 --> 00:18:22,960

video games and things like that but

499

00:18:27,510 --> 00:18:25,679

twitter limits you a little bit there

500

00:18:29,990 --> 00:18:27,520

interestingly we've got movies was the

501
00:18:31,830 --> 00:18:30,000
top response people liked watching film

502
00:18:33,750 --> 00:18:31,840
about exploring the universe books was a

503
00:18:35,029 --> 00:18:33,760
close second though so that kind of

504
00:18:37,110 --> 00:18:35,039
touches near and dear to my heart since

505
00:18:39,029 --> 00:18:37,120
i preferred books myself but we had

506
00:18:41,190 --> 00:18:39,039
things like star star wars in 2001 a

507
00:18:43,270 --> 00:18:41,200
space odyssey where some of the films

508
00:18:44,950 --> 00:18:43,280
mentioned uh many different books were

509
00:18:46,549 --> 00:18:44,960
mentioned i personally mentioned i love

510
00:18:48,070 --> 00:18:46,559
the sci-fi horror video game series

511
00:18:49,909 --> 00:18:48,080
called dead space

512
00:18:52,390 --> 00:18:49,919
which also has its own religious and

513
00:18:55,029 --> 00:18:52,400

scientific aspects as well

514

00:18:57,590 --> 00:18:55,039

but a question then for you lucas is

515

00:19:01,750 --> 00:18:57,600

what stories have inspired you to want

516

00:19:05,029 --> 00:19:01,760

to explore life and explore the universe

517

00:19:07,510 --> 00:19:05,039

oh i am a huge fan of science fiction

518

00:19:10,230 --> 00:19:07,520

i am a fan of a genre that's come to be

519

00:19:11,029 --> 00:19:10,240

known as speculative fiction so rather

520

00:19:13,990 --> 00:19:11,039

than

521

00:19:15,590 --> 00:19:14,000

emphasizing the science it emphasizes

522

00:19:17,029 --> 00:19:15,600

what if things were a little bit

523

00:19:17,909 --> 00:19:17,039

different

524

00:19:20,470 --> 00:19:17,919

um

525

00:19:21,350 --> 00:19:20,480

i certainly enjoy star trek

526
00:19:23,590 --> 00:19:21,360
um

527
00:19:24,950 --> 00:19:23,600
there is an author by the name of ursula

528
00:19:28,150 --> 00:19:24,960
k le guin

529
00:19:29,750 --> 00:19:28,160
who does amazing stories about life on

530
00:19:31,990 --> 00:19:29,760
other planets and how it might be

531
00:19:33,830 --> 00:19:32,000
different than life here i was just

532
00:19:35,669 --> 00:19:33,840
rereading a snippet of her book the

533
00:19:37,990 --> 00:19:35,679
dispossessed

534
00:19:40,549 --> 00:19:38,000
which talks all about both the physics

535
00:19:42,150 --> 00:19:40,559
of space travel and

536
00:19:43,190 --> 00:19:42,160
like traveling away from our comfort

537
00:19:46,470 --> 00:19:43,200
space

538
00:19:47,510 --> 00:19:46,480

so i huge fan of that recently a fan of

539

00:19:49,350 --> 00:19:47,520

uh

540

00:19:52,390 --> 00:19:49,360

media coraphor's

541

00:19:55,190 --> 00:19:52,400

binti trilogy uh which explores some

542

00:19:57,909 --> 00:19:55,200

similar topics uh

543

00:20:00,390 --> 00:19:57,919

sagan is amazing john scalzi is amazing

544

00:20:03,350 --> 00:20:00,400

i'll do a quick plug there is a space on

545

00:20:05,270 --> 00:20:03,360

the page podcast from the library of

546

00:20:08,230 --> 00:20:05,280

congress klugey center

547

00:20:10,149 --> 00:20:08,240

and i have conversations between

548

00:20:13,029 --> 00:20:10,159

astrobiologists and science fiction

549

00:20:15,669 --> 00:20:13,039

authors about exactly these topics

550

00:20:17,590 --> 00:20:15,679

and we have a great time so check that

551
00:20:19,029 --> 00:20:17,600
out if that's interesting that was

552
00:20:20,549 --> 00:20:19,039
actually my next note that i wanted to

553
00:20:22,789 --> 00:20:20,559
ask about the podcast

554
00:20:24,470 --> 00:20:22,799
there have been six episodes now uh

555
00:20:26,710 --> 00:20:24,480
three by by the previous chair of

556
00:20:28,549 --> 00:20:26,720
astrobiology three by yourself is the

557
00:20:31,110 --> 00:20:28,559
intention now to have three for every

558
00:20:32,630 --> 00:20:31,120
chair of astrobiology moving forward uh

559
00:20:34,310 --> 00:20:32,640
and what and also on top of that what

560
00:20:36,070 --> 00:20:34,320
really inspired you to bring together

561
00:20:39,669 --> 00:20:36,080
science fiction authors and scientists

562
00:20:42,230 --> 00:20:39,679
together in the episodes that you ran

563
00:20:44,070 --> 00:20:42,240

yeah um it is our hope that that each

564

00:20:48,630 --> 00:20:44,080

new bloomberg chair will do three new

565

00:20:51,909 --> 00:20:48,640

episodes uh so david barron's focused on

566

00:20:53,110 --> 00:20:51,919

books about the exploration of mars in

567

00:20:55,669 --> 00:20:53,120

particular

568

00:20:59,029 --> 00:20:55,679

and then i had three on science fiction

569

00:21:02,549 --> 00:21:00,950

astrobiology has been wonderful for me

570

00:21:05,350 --> 00:21:02,559

because it's a group of people

571

00:21:07,590 --> 00:21:05,360

willing to ask these big questions

572

00:21:09,430 --> 00:21:07,600

um and it's not just about asking the

573

00:21:11,590 --> 00:21:09,440

big questions though i've discovered

574

00:21:14,310 --> 00:21:11,600

it's asking the big questions and then

575

00:21:15,270 --> 00:21:14,320

seriously asking what science can tell

576
00:21:17,430 --> 00:21:15,280
us

577
00:21:19,190 --> 00:21:17,440
that answers those

578
00:21:20,710 --> 00:21:19,200
or doesn't answer those

579
00:21:22,310 --> 00:21:20,720
um and so

580
00:21:24,390 --> 00:21:22,320
it's a group of people that's very

581
00:21:26,630 --> 00:21:24,400
open-minded really interested in

582
00:21:27,510 --> 00:21:26,640
learning across different fields

583
00:21:29,510 --> 00:21:27,520
um

584
00:21:30,710 --> 00:21:29,520
and so i thought you know

585
00:21:33,029 --> 00:21:30,720
wouldn't it be great to get some of

586
00:21:34,310 --> 00:21:33,039
these people many of whom are our ardent

587
00:21:35,430 --> 00:21:34,320
sci-fi

588
00:21:37,190 --> 00:21:35,440

fans

589

00:21:38,710 --> 00:21:37,200

together with science fiction authors

590

00:21:39,830 --> 00:21:38,720

and really talk about

591

00:21:42,070 --> 00:21:39,840

this

592

00:21:45,029 --> 00:21:42,080

imaginative exploration of the universe

593

00:21:47,029 --> 00:21:45,039

that we're all doing together

594

00:21:48,870 --> 00:21:47,039

that's fantastic and i love that you

595

00:21:51,270 --> 00:21:48,880

brought up big questions answer biology

596

00:21:52,549 --> 00:21:51,280

is about big questions and we humans

597

00:21:54,310 --> 00:21:52,559

we've been asking ourselves not just

598

00:21:56,310 --> 00:21:54,320

through science but through theology and

599

00:21:58,149 --> 00:21:56,320

through you know philosophy these very

600

00:22:00,390 --> 00:21:58,159

big questions for a long time and i'd

601
00:22:01,190 --> 00:22:00,400
like to share a personal story um right

602
00:22:03,270 --> 00:22:01,200
now

603
00:22:04,390 --> 00:22:03,280
when i was young i went to a methodist

604
00:22:07,510 --> 00:22:04,400
church

605
00:22:09,029 --> 00:22:07,520
but when i was a young person i went to

606
00:22:11,669 --> 00:22:09,039
a methodist church and

607
00:22:13,909 --> 00:22:11,679
pastor tom ozenbach was my pastor when i

608
00:22:16,149 --> 00:22:13,919
was a young child but he was my family's

609
00:22:19,029 --> 00:22:16,159
pastor as well he was involved in our

610
00:22:21,430 --> 00:22:19,039
lives everything that i saw weddings and

611
00:22:24,549 --> 00:22:21,440
funerals family gatherings he was always

612
00:22:26,549 --> 00:22:24,559
there and as i progressed in my life and

613
00:22:28,549 --> 00:22:26,559

started exploring more in philosophy and

614

00:22:30,470 --> 00:22:28,559

science uh i went to college and started

615

00:22:32,070 --> 00:22:30,480

studying the sciences and he knew i was

616

00:22:34,149 --> 00:22:32,080

very interested in space exploration and

617

00:22:35,990 --> 00:22:34,159

i'd interned for nasa and did some of

618

00:22:37,909 --> 00:22:36,000

these really cool things and and so at

619

00:22:39,990 --> 00:22:37,919

that point every time i would i would go

620

00:22:42,149 --> 00:22:40,000

home to pennsylvania

621

00:22:44,630 --> 00:22:42,159

to see a wedding or unfortunately a

622

00:22:46,470 --> 00:22:44,640

funeral and pastor tom would be there he

623

00:22:47,190 --> 00:22:46,480

always wanted to have conversations with

624

00:22:53,830 --> 00:22:47,200

me

625

00:22:56,310 --> 00:22:53,840

sharing in big questions with people

626

00:22:58,549 --> 00:22:56,320

with slightly different viewpoints um

627

00:23:00,470 --> 00:22:58,559

for instance during my grandfather's

628

00:23:02,470 --> 00:23:00,480

funeral when he passed away which is

629

00:23:04,950 --> 00:23:02,480

very hard for me uh pastor tom and i had

630

00:23:06,950 --> 00:23:04,960

a really just very beautiful moment

631

00:23:08,470 --> 00:23:06,960

about maybe an hour long conversation

632

00:23:09,990 --> 00:23:08,480

because he saw that i was dealing with a

633

00:23:11,590 --> 00:23:10,000

lot of stuff

634

00:23:13,750 --> 00:23:11,600

we got into a conversation about our

635

00:23:15,510 --> 00:23:13,760

beliefs and understanding but then we

636

00:23:17,830 --> 00:23:15,520

also started talking about the cosmos

637

00:23:19,510 --> 00:23:17,840

and about space and pastor tom always

638

00:23:22,070 --> 00:23:19,520

wanted to hear about the best hubble

639

00:23:24,070 --> 00:23:22,080

space telescope images and new missions

640

00:23:26,789 --> 00:23:24,080

from nasa and when we were going to

641

00:23:28,070 --> 00:23:26,799

europa and mars and venus and all of

642

00:23:29,510 --> 00:23:28,080

these kinds of things he wanted to know

643

00:23:31,350 --> 00:23:29,520

when those things were going to happen

644

00:23:33,110 --> 00:23:31,360

and if i was part of it and what i knew

645

00:23:34,830 --> 00:23:33,120

about it and then he was always trying

646

00:23:37,430 --> 00:23:34,840

to to frame that himself in the

647

00:23:39,510 --> 00:23:37,440

conversation with god and christianity

648

00:23:41,830 --> 00:23:39,520

and the bible and his understanding of

649

00:23:43,750 --> 00:23:41,840

the world and so i'd like to kind of

650

00:23:44,710 --> 00:23:43,760

using this story also transition now to

651
00:23:47,269 --> 00:23:44,720
something else that you've been working

652
00:23:49,029 --> 00:23:47,279
with uh the eckless project

653
00:23:51,190 --> 00:23:49,039
equipping christian leadership in an age

654
00:23:53,430 --> 00:23:51,200
of science i'd love to hear more about

655
00:23:56,710 --> 00:23:53,440
the project in general and as well as

656
00:23:57,669 --> 00:23:56,720
your role in this project

657
00:24:00,230 --> 00:23:57,679
yeah

658
00:24:01,029 --> 00:24:00,240
we did some some sociological research

659
00:24:03,830 --> 00:24:01,039
um

660
00:24:05,269 --> 00:24:03,840
i think up to 10 years ago now and asked

661
00:24:06,950 --> 00:24:05,279
people where they got their science

662
00:24:08,950 --> 00:24:06,960
information from

663
00:24:11,110 --> 00:24:08,960

um and who they talked to about science

664

00:24:12,710 --> 00:24:11,120

and a lot of them like graham talk to

665

00:24:13,510 --> 00:24:12,720

their pastor about it

666

00:24:18,070 --> 00:24:13,520

um

667

00:24:19,350 --> 00:24:18,080

equipping christian leadership in an age

668

00:24:22,149 --> 00:24:19,360

of science

669

00:24:23,110 --> 00:24:22,159

is the program in the united kingdom

670

00:24:25,750 --> 00:24:23,120

that

671

00:24:26,950 --> 00:24:25,760

really works at how do we get science

672

00:24:30,710 --> 00:24:26,960

information

673

00:24:32,230 --> 00:24:30,720

to church leaders um and more than that

674

00:24:34,789 --> 00:24:32,240

how do we get them to really think

675

00:24:36,950 --> 00:24:34,799

critically about engaging like how do

676

00:24:40,390 --> 00:24:36,960

the pieces get put together

677

00:24:42,710 --> 00:24:40,400

so eclis in particular we do

678

00:24:45,190 --> 00:24:42,720

conferences for senior leaders we get

679

00:24:46,390 --> 00:24:45,200

science information to them

680

00:24:48,710 --> 00:24:46,400

we have

681

00:24:49,990 --> 00:24:48,720

grant programs for congregations and for

682

00:24:52,070 --> 00:24:50,000

seminaries

683

00:24:54,149 --> 00:24:52,080

but we also do research and a little bit

684

00:24:56,870 --> 00:24:54,159

of policy advising

685

00:24:57,909 --> 00:24:56,880

on science religion topics

686

00:25:01,350 --> 00:24:57,919

i

687

00:25:03,430 --> 00:25:01,360

myself

688

00:25:05,669 --> 00:25:03,440

that all of us do the work of

689

00:25:08,870 --> 00:25:05,679

interpreting our place in the universe

690

00:25:10,950 --> 00:25:08,880

like all of us ask questions of science

691

00:25:12,630 --> 00:25:10,960

it's only a question it's only a matter

692

00:25:14,549 --> 00:25:12,640

of whether we do that well

693

00:25:15,830 --> 00:25:14,559

you know how do we engage with experts

694

00:25:17,909 --> 00:25:15,840

how do we think critically about the

695

00:25:19,830 --> 00:25:17,919

physical world and i think the same is

696

00:25:21,190 --> 00:25:19,840

true about ethics and worldview and

697

00:25:23,190 --> 00:25:21,200

meaning

698

00:25:24,549 --> 00:25:23,200

everyone is doing these theological

699

00:25:26,590 --> 00:25:24,559

things

700

00:25:28,390 --> 00:25:26,600

um you know maybe it's not

701
00:25:29,830 --> 00:25:28,400
theologically uh you know maybe we

702
00:25:32,230 --> 00:25:29,840
wouldn't use that word if you're not a

703
00:25:34,310 --> 00:25:32,240
theist um but everyone wants to know how

704
00:25:36,630 --> 00:25:34,320
they fit into the world

705
00:25:38,149 --> 00:25:36,640
and so if all of us are doing all of

706
00:25:40,230 --> 00:25:38,159
this work together

707
00:25:43,830 --> 00:25:40,240
how do we have conversations together

708
00:25:45,830 --> 00:25:43,840
about doing it well so i really do think

709
00:25:48,470 --> 00:25:45,840
all of us are doing science

710
00:25:51,430 --> 00:25:48,480
all of us are doing theology

711
00:25:53,990 --> 00:25:51,440
um but let's let's think about doing it

712
00:25:55,029 --> 00:25:54,000
collectively critically

713
00:25:57,590 --> 00:25:55,039

um

714

00:26:00,230 --> 00:25:57,600

and and bring the best of ourselves to

715

00:26:03,110 --> 00:26:00,240

it uh so i'm i'm really passionate about

716

00:26:05,830 --> 00:26:03,120

this and and getting particularly the

717

00:26:07,029 --> 00:26:05,840

people who have devoted their lives to

718

00:26:12,230 --> 00:26:07,039

um

719

00:26:13,430 --> 00:26:12,240

those conversations with others

720

00:26:14,630 --> 00:26:13,440

and start putting all the pieces

721

00:26:16,310 --> 00:26:14,640

together

722

00:26:18,310 --> 00:26:16,320

you know it's so powerful and i feel

723

00:26:20,630 --> 00:26:18,320

like so many people focus so much on on

724

00:26:21,909 --> 00:26:20,640

the tools of division and not so much on

725

00:26:23,669 --> 00:26:21,919

the tools that really can help us come

726

00:26:25,430 --> 00:26:23,679

together and i love that that quote you

727

00:26:26,950 --> 00:26:25,440

just said there of all of us are trying

728

00:26:28,549 --> 00:26:26,960

to interpret you know our understanding

729

00:26:29,590 --> 00:26:28,559

of our place in the universe that's

730

00:26:31,269 --> 00:26:29,600

that's really important this

731

00:26:33,190 --> 00:26:31,279

interpretation because we all come to it

732

00:26:35,350 --> 00:26:33,200

from our own background our own

733

00:26:36,789 --> 00:26:35,360

experiences our own personal lens and we

734

00:26:39,669 --> 00:26:36,799

all have so many differences but there's

735

00:26:41,830 --> 00:26:39,679

so much to share so much to work on

736

00:26:43,110 --> 00:26:41,840

together um we have a few more things we

737

00:26:45,190 --> 00:26:43,120

want to talk about with you for the

738

00:26:47,750 --> 00:26:45,200

audience i promise i will get to the q a

739

00:26:50,310 --> 00:26:47,760

and your questions for lucas very very

740

00:26:52,470 --> 00:26:50,320

soon um one more thing actually two more

741

00:26:54,470 --> 00:26:52,480

things before i go into a new segment

742

00:26:56,870 --> 00:26:54,480

we're going to introduce for the show um

743

00:26:58,390 --> 00:26:56,880

first off i mentioned earlier that i

744

00:27:00,950 --> 00:26:58,400

heard you give a talk on ascension

745

00:27:02,549 --> 00:27:00,960

narratives at the meeting of sosha

746

00:27:04,950 --> 00:27:02,559

that's the society for social and

747

00:27:06,710 --> 00:27:04,960

conceptual issues in astrobiology

748

00:27:08,230 --> 00:27:06,720

you are one of the founding members and

749

00:27:10,070 --> 00:27:08,240

someone has been part of social for some

750

00:27:11,990 --> 00:27:10,080

time um i'd love it if you could just

751
00:27:14,070 --> 00:27:12,000
explain to our audience some of whom

752
00:27:15,909 --> 00:27:14,080
might want to take part in social in the

753
00:27:18,310 --> 00:27:15,919
future about the organization and what

754
00:27:19,190 --> 00:27:18,320
future meetings will look like

755
00:27:21,750 --> 00:27:19,200
yeah

756
00:27:23,350 --> 00:27:21,760
so astrobiology has always been good at

757
00:27:24,789 --> 00:27:23,360
being interdisciplinary and there are

758
00:27:26,710 --> 00:27:24,799
some of us who

759
00:27:29,510 --> 00:27:26,720
don't just do natural sciences and do

760
00:27:31,909 --> 00:27:29,520
that um but it's sort of hard in the

761
00:27:35,750 --> 00:27:31,919
science conferences to get time for

762
00:27:37,990 --> 00:27:35,760
those those big questions and those um

763
00:27:38,870 --> 00:27:38,000

things like theology and philosophy and

764

00:27:41,909 --> 00:27:38,880

ethics

765

00:27:44,710 --> 00:27:41,919

so we started this group

766

00:27:46,230 --> 00:27:44,720

uh called socia and it's specifically

767

00:27:48,389 --> 00:27:46,240

focused on

768

00:27:52,710 --> 00:27:48,399

social and conceptual issues related to

769

00:27:54,070 --> 00:27:52,720

astrobiology uh we try and meet uh every

770

00:27:56,389 --> 00:27:54,080

other year

771

00:27:59,269 --> 00:27:56,399

um and so we have an academic conference

772

00:28:01,510 --> 00:27:59,279

but i think if you if you google socia

773

00:28:04,389 --> 00:28:01,520

s-s-o-c-i-a

774

00:28:07,669 --> 00:28:04,399

um it should pop up

775

00:28:10,230 --> 00:28:07,679

and you can learn more about all of the

776

00:28:11,750 --> 00:28:10,240

cool people and events that we have

777

00:28:13,909 --> 00:28:11,760

awesome yeah i was really happy to

778

00:28:15,909 --> 00:28:13,919

attend myself i gave a talk in the realm

779

00:28:17,830 --> 00:28:15,919

of astrobotany and a current project i

780

00:28:19,669 --> 00:28:17,840

have and the ethics of growing plants in

781

00:28:20,870 --> 00:28:19,679

mars regolith with the artist lucia

782

00:28:22,630 --> 00:28:20,880

monge

783

00:28:23,990 --> 00:28:22,640

which and i really enjoyed all the talks

784

00:28:25,350 --> 00:28:24,000

of the conference it's a really fun

785

00:28:27,909 --> 00:28:25,360

meeting and a good group of people to

786

00:28:29,190 --> 00:28:27,919

join um lucas before i get to a new

787

00:28:31,590 --> 00:28:29,200

segment we're going to try i have one

788

00:28:33,190 --> 00:28:31,600

more thing um i myself have been

789

00:28:35,990 --> 00:28:33,200

training in the martial arts since i was

790

00:28:37,110 --> 00:28:36,000

five years old i've traveled to korea to

791

00:28:38,870 --> 00:28:37,120

train

792

00:28:41,190 --> 00:28:38,880

i've learned different kinds of styles

793

00:28:43,110 --> 00:28:41,200

tangsudo taekwondo

794

00:28:45,269 --> 00:28:43,120

okinawan weapons all kinds of things and

795

00:28:47,269 --> 00:28:45,279

i think a lot of us in the sciences and

796

00:28:48,470 --> 00:28:47,279

various realms of academia are also

797

00:28:50,310 --> 00:28:48,480

martial artists and i understand that

798

00:28:52,149 --> 00:28:50,320

you're a martial artist as well

799

00:28:53,590 --> 00:28:52,159

i'd love to hear you talk about what

800

00:28:55,430 --> 00:28:53,600

martial arts training has done for you

801
00:28:57,269 --> 00:28:55,440
in your life what it means for you what

802
00:28:59,350 --> 00:28:57,279
styles you train in and anything around

803
00:29:00,389 --> 00:28:59,360
that realm as well

804
00:29:01,669 --> 00:29:00,399
yeah

805
00:29:04,310 --> 00:29:01,679
i am

806
00:29:06,870 --> 00:29:04,320
martial arts is the family business and

807
00:29:09,029 --> 00:29:06,880
i started when i was seven years old so

808
00:29:10,630 --> 00:29:09,039
i usually tell people it's hard to say

809
00:29:12,230 --> 00:29:10,640
what impact it's had on my life because

810
00:29:13,269 --> 00:29:12,240
i don't remember life without martial

811
00:29:16,870 --> 00:29:13,279
arts

812
00:29:19,990 --> 00:29:16,880
i started in taekwondo which is a korean

813
00:29:21,190 --> 00:29:20,000

style that focuses on kicks and punches

814

00:29:29,190 --> 00:29:21,200

i

815

00:29:30,950 --> 00:29:29,200

throws

816

00:29:32,230 --> 00:29:30,960

um

817

00:29:34,389 --> 00:29:32,240

i am just

818

00:29:36,789 --> 00:29:34,399

well once again for me it's all about

819

00:29:37,669 --> 00:29:36,799

negotiating your way in the universe

820

00:29:39,510 --> 00:29:37,679

um

821

00:29:41,510 --> 00:29:39,520

and uh and how keto has given me some

822

00:29:43,669 --> 00:29:41,520

very concrete tools for like

823

00:29:44,870 --> 00:29:43,679

understanding how i fit

824

00:29:47,029 --> 00:29:44,880

um

825

00:29:49,269 --> 00:29:47,039

and uh it's nice to have practical

826

00:29:51,510 --> 00:29:49,279

demonstrations you know i particularly

827

00:29:53,190 --> 00:29:51,520

as an academic there's lots of of

828

00:29:54,870 --> 00:29:53,200

abstract questions

829

00:29:56,630 --> 00:29:54,880

and you know when

830

00:29:58,950 --> 00:29:56,640

when someone throws you or when you pick

831

00:30:02,149 --> 00:29:58,960

up and throw someone like that's a very

832

00:30:03,750 --> 00:30:02,159

practical activity um and uh much to

833

00:30:05,110 --> 00:30:03,760

many people's surprise

834

00:30:07,029 --> 00:30:05,120

if someone knows how to throw you it's

835

00:30:09,669 --> 00:30:07,039

very fun to be thrown

836

00:30:11,909 --> 00:30:09,679

as long as you know how to land properly

837

00:30:14,710 --> 00:30:11,919

um but we make sure you learn that first

838

00:30:17,590 --> 00:30:14,720

uh also a big fan of of tai chi

839

00:30:19,029 --> 00:30:17,600

uh i have been teaching hapkido and tai

840

00:30:20,389 --> 00:30:19,039

chi

841

00:30:22,950 --> 00:30:20,399

oh for

842

00:30:25,909 --> 00:30:22,960

30 years now um but if you want to know

843

00:30:28,789 --> 00:30:25,919

more enso center for international arts

844

00:30:30,389 --> 00:30:28,799

uh in redmond uh we have some great hub

845

00:30:32,310 --> 00:30:30,399

keto programs

846

00:30:34,070 --> 00:30:32,320

i love it yeah i'm glad to go plug your

847

00:30:35,190 --> 00:30:34,080

martial arts school um yeah for me

848

00:30:37,350 --> 00:30:35,200

myself you know training the martial

849

00:30:39,269 --> 00:30:37,360

arts it was my first you know way of

850

00:30:41,269 --> 00:30:39,279

learning about meditation and meditation

851
00:30:42,789 --> 00:30:41,279
practices learning about external and

852
00:30:44,630 --> 00:30:42,799
internal martial arts and experiential

853
00:30:46,230 --> 00:30:44,640
learning using your body and space and

854
00:30:47,510 --> 00:30:46,240
and yes following learning how to fall

855
00:30:49,269 --> 00:30:47,520
well is very helpful it's helped me in

856
00:30:51,350 --> 00:30:49,279
my own life in mountain biking or

857
00:30:53,830 --> 00:30:51,360
snowboarding knowing how to fall well is

858
00:30:54,630 --> 00:30:53,840
also very important to protect our lives

859
00:30:57,029 --> 00:30:54,640
too

860
00:30:58,789 --> 00:30:57,039
um so i'd love to transition now to a

861
00:31:00,630 --> 00:30:58,799
new segment we want to try out you're

862
00:31:03,029 --> 00:31:00,640
our guinea pig our first test subject

863
00:31:05,110 --> 00:31:03,039

for this new segment it's a rapid fire

864

00:31:07,110 --> 00:31:05,120

question segment and so if you can try

865

00:31:09,029 --> 00:31:07,120

to keep your answers to like 30 to 60

866

00:31:11,350 --> 00:31:09,039

seconds if possible we have a few

867

00:31:12,710 --> 00:31:11,360

questions we'd like to ask uh just so

868

00:31:15,029 --> 00:31:12,720

our audience has a better kind of

869

00:31:17,669 --> 00:31:15,039

understanding of you and your take on

870

00:31:19,990 --> 00:31:17,679

astrobiology and some other topics uh so

871

00:31:22,389 --> 00:31:20,000

first and foremost what is your favorite

872

00:31:24,470 --> 00:31:22,399

answer to fermi's question where are

873

00:31:26,870 --> 00:31:24,480

they

874

00:31:30,149 --> 00:31:26,880

i don't think the quote-unquote fermi

875

00:31:33,269 --> 00:31:30,159

paradox is a paradox um we don't know

876

00:31:34,789 --> 00:31:33,279

and we're looking and i think they are

877

00:31:37,110 --> 00:31:34,799

going to be different than what we

878

00:31:39,430 --> 00:31:37,120

expect and we haven't seen them because

879

00:31:41,669 --> 00:31:39,440

we don't yet know what we're looking for

880

00:31:43,990 --> 00:31:41,679

so how do we look

881

00:31:47,509 --> 00:31:44,000

more open-mindedly

882

00:31:48,950 --> 00:31:47,519

and more critically at the same time

883

00:31:51,110 --> 00:31:48,960

very good

884

00:31:53,190 --> 00:31:51,120

if you could go back in time and give

885

00:31:55,269 --> 00:31:53,200

your earlier self some advice at the

886

00:31:58,950 --> 00:31:55,279

start of your career what advice would

887

00:31:58,960 --> 00:32:04,870

don't worry so much

888

00:32:07,269 --> 00:32:06,070

that's a pretty good answer nice and

889

00:32:09,669 --> 00:32:07,279

short

890

00:32:11,590 --> 00:32:09,679

um so if there is alien life out there

891

00:32:13,750 --> 00:32:11,600

do you think we'll find it first in our

892

00:32:17,350 --> 00:32:13,760

solar system or do you think we'll find

893

00:32:20,149 --> 00:32:17,360

it first on an exoplanet

894

00:32:24,389 --> 00:32:22,149

i try to keep an open mind on that i

895

00:32:26,389 --> 00:32:24,399

don't i don't want to commit

896

00:32:27,990 --> 00:32:26,399

okay i love it you know i guess there's

897

00:32:30,710 --> 00:32:28,000

also the option of neither could be out

898

00:32:35,110 --> 00:32:30,720

in space somewhere um what's something

899

00:32:39,590 --> 00:32:37,669

i am really excited

900

00:32:42,230 --> 00:32:39,600

about

901
00:32:45,190 --> 00:32:42,240
all sorts of things i think artificial

902
00:32:47,509 --> 00:32:45,200
intelligence is a great way to meet

903
00:32:49,269 --> 00:32:47,519
things that are not quite like us but

904
00:32:50,830 --> 00:32:49,279
sort of like us

905
00:32:54,070 --> 00:32:50,840
i think that

906
00:32:56,710 --> 00:32:54,080
bioengineering and gene editing

907
00:32:58,710 --> 00:32:56,720
while they are scary are also just a

908
00:32:59,669 --> 00:32:58,720
whole new way of understanding how we

909
00:33:02,070 --> 00:32:59,679
fit

910
00:33:03,990 --> 00:33:02,080
and of course astrobiology

911
00:33:05,990 --> 00:33:04,000
i remember very clearly the first

912
00:33:08,310 --> 00:33:06,000
astrobiology primer

913
00:33:10,950 --> 00:33:08,320

we had this great little diagram that

914

00:33:12,870 --> 00:33:10,960

had a dot for every planet that we had

915

00:33:13,669 --> 00:33:12,880

discovered um

916

00:33:15,350 --> 00:33:13,679

and

917

00:33:17,110 --> 00:33:15,360

there's so many

918

00:33:19,110 --> 00:33:17,120

extrasolar planets now that they won't

919

00:33:21,029 --> 00:33:19,120

all fit on the page and that's a that's

920

00:33:21,990 --> 00:33:21,039

a great problem to have we can we can

921

00:33:24,470 --> 00:33:22,000

start

922

00:33:25,350 --> 00:33:24,480

uh asking new sorts of questions

923

00:33:27,590 --> 00:33:25,360

so

924

00:33:30,389 --> 00:33:27,600

there's just all of these

925

00:33:32,230 --> 00:33:30,399

amazing things out there

926
00:33:34,630 --> 00:33:32,240
um and there are all sorts of amazing

927
00:33:37,190 --> 00:33:34,640
things in there

928
00:33:38,549 --> 00:33:37,200
why you know it's a

929
00:33:41,830 --> 00:33:38,559
wonderful

930
00:33:43,029 --> 00:33:41,840
life if you can explore and discover

931
00:33:44,630 --> 00:33:43,039
fantastic

932
00:33:47,350 --> 00:33:44,640
what would you say is the best part of

933
00:33:51,750 --> 00:33:49,430
talking to people about what they think

934
00:33:54,149 --> 00:33:51,760
is real

935
00:33:56,389 --> 00:33:54,159
love that that's so cool um it's a very

936
00:33:58,630 --> 00:33:56,399
fun one for me too um

937
00:34:01,110 --> 00:33:58,640
so here here's the fun one what is the

938
00:34:05,509 --> 00:34:01,120

most unbelievable science fact that you

939

00:34:11,990 --> 00:34:08,950

i think off the top of my head would be

940

00:34:14,869 --> 00:34:12,000

there is a species of bacterium

941

00:34:17,510 --> 00:34:14,879

linococcus radidurans

942

00:34:19,030 --> 00:34:17,520

which thrives in high levels of

943

00:34:21,510 --> 00:34:19,040

radiation

944

00:34:24,069 --> 00:34:21,520

that would basically melt us

945

00:34:27,510 --> 00:34:24,079

and this was probably an adaptation to

946

00:34:28,990 --> 00:34:27,520

dryness not radioactivity but the idea

947

00:34:30,550 --> 00:34:29,000

that life

948

00:34:33,909 --> 00:34:30,560

responds

949

00:34:36,389 --> 00:34:33,919

with these amazing adaptations and does

950

00:34:39,109 --> 00:34:36,399

things we would never imagine

951
00:34:41,349 --> 00:34:39,119
ah just blows me away i love that so

952
00:34:43,349 --> 00:34:41,359
much yeah so i love dino cox's radio

953
00:34:45,669 --> 00:34:43,359
durians too for its name uh the

954
00:34:47,829 --> 00:34:45,679
dinococcus literally means terrible

955
00:34:49,750 --> 00:34:47,839
berry uh just like dinosaur meant

956
00:34:51,669 --> 00:34:49,760
terrible lizard dinococcus is a terrible

957
00:34:53,270 --> 00:34:51,679
berry and i find that pretty funny since

958
00:34:55,589 --> 00:34:53,280
it withstands so much radiation it's

959
00:34:58,069 --> 00:34:55,599
pretty cool um so thank you so much for

960
00:34:59,670 --> 00:34:58,079
your conversation with me but now i'm

961
00:35:01,589 --> 00:34:59,680
going to open it up for our audience who

962
00:35:03,829 --> 00:35:01,599
are watching on youtube if they have any

963
00:35:05,430 --> 00:35:03,839

specific questions for you as well

964

00:35:07,349 --> 00:35:05,440

uh the first one i want to ask actually

965

00:35:09,510 --> 00:35:07,359

comes to us from twitter though

966

00:35:10,470 --> 00:35:09,520

from our ambassador of this month dr jim

967

00:35:13,589 --> 00:35:10,480

pass

968

00:35:14,870 --> 00:35:13,599

he's at astrosociology on twitter

969

00:35:17,829 --> 00:35:14,880

and like i said when i started the

970

00:35:19,910 --> 00:35:17,839

episode dr pass almost always has really

971

00:35:21,270 --> 00:35:19,920

just wonderful questions about how we

972

00:35:23,750 --> 00:35:21,280

how we can connect we're doing in

973

00:35:26,630 --> 00:35:23,760

astrobiology science to astrobiology

974

00:35:28,790 --> 00:35:26,640

sociology and the humanities

975

00:35:30,510 --> 00:35:28,800

so from dr pass when it comes to space

976
00:35:32,150 --> 00:35:30,520
education and research

977
00:35:33,829 --> 00:35:32,160
multi-disciplinary is too often

978
00:35:36,630 --> 00:35:33,839
restricted to the natural and physical

979
00:35:38,550 --> 00:35:36,640
sciences how do religious studies and

980
00:35:40,710 --> 00:35:38,560
more broadly other social sciences and

981
00:35:42,390 --> 00:35:40,720
humanities currently contribute into

982
00:35:46,310 --> 00:35:42,400
your view and how should these

983
00:35:51,430 --> 00:35:47,910
yes um

984
00:35:53,510 --> 00:35:51,440
the 2015 strategy document document from

985
00:35:55,750 --> 00:35:53,520
nasa astrobiology in fact has an

986
00:35:56,470 --> 00:35:55,760
appendix that i was one of the authors

987
00:35:59,829 --> 00:35:56,480
on

988
00:36:01,670 --> 00:35:59,839

detail

989

00:36:02,950 --> 00:36:01,680

but um

990

00:36:06,069 --> 00:36:02,960

i think

991

00:36:07,829 --> 00:36:06,079

well for me the biggest one is we use

992

00:36:10,310 --> 00:36:07,839

this we throw this word life around a

993

00:36:12,150 --> 00:36:10,320

lot um and there's a lot of reflection

994

00:36:14,630 --> 00:36:12,160

in theology

995

00:36:16,390 --> 00:36:14,640

and sociology and philosophy about what

996

00:36:17,670 --> 00:36:16,400

we mean when we say life

997

00:36:18,550 --> 00:36:17,680

and different people mean different

998

00:36:24,630 --> 00:36:18,560

things

999

00:36:27,910 --> 00:36:26,069

with people in the social sciences and

1000

00:36:29,270 --> 00:36:27,920

humanities is what we're looking for in

1001

00:36:31,030 --> 00:36:29,280

terms of life

1002

00:36:33,589 --> 00:36:31,040

i think this question of standard

1003

00:36:35,430 --> 00:36:33,599

standards of evidence is very important

1004

00:36:37,109 --> 00:36:35,440

like what does it take to convince us of

1005

00:36:38,470 --> 00:36:37,119

something

1006

00:36:41,510 --> 00:36:38,480

i think

1007

00:36:44,550 --> 00:36:41,520

why we care is deeply important

1008

00:36:46,870 --> 00:36:44,560

i think the social structures we use to

1009

00:36:49,510 --> 00:36:46,880

ask these questions are really important

1010

00:36:51,910 --> 00:36:49,520

and that's an area where science and

1011

00:36:54,870 --> 00:36:51,920

religion have interesting and very

1012

00:36:57,270 --> 00:36:54,880

diverse ways to contribute

1013

00:36:59,349 --> 00:36:57,280

because they tend to be structured

1014

00:37:01,589 --> 00:36:59,359

socially very differently

1015

00:37:04,310 --> 00:37:01,599

both of them unfortunately have some

1016

00:37:06,950 --> 00:37:04,320

dangerous built-in biases

1017

00:37:08,870 --> 00:37:06,960

and so being able to do theology and

1018

00:37:11,270 --> 00:37:08,880

science at the same time gives us an

1019

00:37:13,190 --> 00:37:11,280

opportunity to unpack those biases in a

1020

00:37:15,109 --> 00:37:13,200

really powerful way

1021

00:37:17,589 --> 00:37:15,119

i love that so much now that leads so

1022

00:37:19,990 --> 00:37:17,599

well into our next question as well

1023

00:37:22,550 --> 00:37:20,000

um which i'm i i thought we would get

1024

00:37:24,710 --> 00:37:22,560

this question and so i'm glad we did um

1025

00:37:27,589 --> 00:37:24,720

so i'd love to hear your take on it uh

1026
00:37:28,790 --> 00:37:27,599
so on youtube user luis miguel rodriguez

1027
00:37:31,109 --> 00:37:28,800
has asked

1028
00:37:33,190 --> 00:37:31,119
how can we manage to reconcile a faith

1029
00:37:35,430 --> 00:37:33,200
in god with the sciences

1030
00:37:37,349 --> 00:37:35,440
and i imagine that luis is speaking

1031
00:37:39,510 --> 00:37:37,359
primarily to the fact that there is some

1032
00:37:41,030 --> 00:37:39,520
division amongst people who think that

1033
00:37:42,310 --> 00:37:41,040
you can't you can't believe in the

1034
00:37:44,950 --> 00:37:42,320
sciences or understand things from the

1035
00:37:47,670 --> 00:37:44,960
sciences and have a faith in god and

1036
00:37:49,670 --> 00:37:47,680
they have abrahamic religions um i think

1037
00:37:51,430 --> 00:37:49,680
we focus so much on division so i'd love

1038
00:37:53,750 --> 00:37:51,440

to hear your take on on bringing

1039

00:37:56,069 --> 00:37:53,760

together both faith and understanding of

1040

00:37:57,589 --> 00:37:56,079

science

1041

00:37:59,510 --> 00:37:57,599

yeah part of it is a matter of

1042

00:38:03,430 --> 00:37:59,520

perspective those of us

1043

00:38:06,390 --> 00:38:03,440

particularly in the anglican church

1044

00:38:08,710 --> 00:38:06,400

have never seen this as a as a big issue

1045

00:38:12,550 --> 00:38:08,720

um the founders of modern science were

1046

00:38:15,430 --> 00:38:12,560

anglican uh newton and bank bacon um

1047

00:38:16,630 --> 00:38:15,440

galileo likewise was was a devout roman

1048

00:38:18,390 --> 00:38:16,640

catholic

1049

00:38:19,349 --> 00:38:18,400

and

1050

00:38:21,910 --> 00:38:19,359

i think

1051

00:38:23,829 --> 00:38:21,920

the challenge is not one of science per

1052

00:38:27,190 --> 00:38:23,839

se but one of theology

1053

00:38:29,990 --> 00:38:27,200

and how we come to have our how we how

1054

00:38:32,230 --> 00:38:30,000

we come to know what we know um and

1055

00:38:33,589 --> 00:38:32,240

think what we think and how we reason

1056

00:38:34,790 --> 00:38:33,599

with others

1057

00:38:37,109 --> 00:38:34,800

and so

1058

00:38:41,030 --> 00:38:37,119

uh the challenge and i do think it is it

1059

00:38:43,030 --> 00:38:41,040

is right and good that religious people

1060

00:38:45,510 --> 00:38:43,040

have beliefs and i don't think that

1061

00:38:47,589 --> 00:38:45,520

those need to be justified by science

1062

00:38:50,069 --> 00:38:47,599

i do think that

1063

00:38:53,270 --> 00:38:50,079

science is a wonderful opportunity and

1064

00:38:55,589 --> 00:38:53,280

so my my theological convictions

1065

00:38:56,710 --> 00:38:55,599

are that we should respect

1066

00:38:59,589 --> 00:38:56,720

some

1067

00:39:01,589 --> 00:38:59,599

uh we should respect the in the

1068

00:39:03,430 --> 00:39:01,599

science when it is done well

1069

00:39:05,109 --> 00:39:03,440

um and i think most

1070

00:39:07,270 --> 00:39:05,119

christians would agree with that but

1071

00:39:09,109 --> 00:39:07,280

what it means to do it well is a really

1072

00:39:11,190 --> 00:39:09,119

tough social question

1073

00:39:12,069 --> 00:39:11,200

so i like to encourage people to think

1074

00:39:15,430 --> 00:39:12,079

through

1075

00:39:18,550 --> 00:39:15,440

how do we do that work together how do

1076
00:39:20,310 --> 00:39:18,560
we respect what we observe through

1077
00:39:22,310 --> 00:39:20,320
empirical reasoning

1078
00:39:23,910 --> 00:39:22,320
and peer review and all of these good

1079
00:39:25,829 --> 00:39:23,920
scientific things

1080
00:39:27,349 --> 00:39:25,839
um

1081
00:39:29,910 --> 00:39:27,359
and

1082
00:39:31,589 --> 00:39:29,920
how do we take seriously the impact that

1083
00:39:33,589 --> 00:39:31,599
has on our lives and our view of

1084
00:39:35,270 --> 00:39:33,599
ourselves uh and our view of our

1085
00:39:36,630 --> 00:39:35,280
relationship with god

1086
00:39:40,550 --> 00:39:36,640
so

1087
00:39:41,430 --> 00:39:40,560
i think it's a an opportunity

1088
00:39:43,589 --> 00:39:41,440

um

1089

00:39:45,510 --> 00:39:43,599

that's a nice beautiful answer i'd like

1090

00:39:48,470 --> 00:39:45,520

to actually go to another question then

1091

00:39:50,390 --> 00:39:48,480

um from aeronava padar who's also an

1092

00:39:51,750 --> 00:39:50,400

intern for my company this summer uh in

1093

00:39:53,829 --> 00:39:51,760

the young scientists program at blue

1094

00:39:55,829 --> 00:39:53,839

marble space institute of science uh

1095

00:39:57,910 --> 00:39:55,839

erinova also then kind of following on

1096

00:39:59,589 --> 00:39:57,920

to that wants to know if if you can

1097

00:40:01,750 --> 00:39:59,599

answer or if there are questions that

1098

00:40:03,349 --> 00:40:01,760

might directly conflict in theology with

1099

00:40:05,589 --> 00:40:03,359

space exploration

1100

00:40:06,790 --> 00:40:05,599

um so kind of going on top of that then

1101

00:40:08,550 --> 00:40:06,800

i know that there are some people for

1102

00:40:11,349 --> 00:40:08,560

instance who are opposed to having

1103

00:40:13,349 --> 00:40:11,359

humans go to space or go explore mars

1104

00:40:18,309 --> 00:40:13,359

are there conflicts that you see

1105

00:40:22,950 --> 00:40:20,390

i think there are many different

1106

00:40:26,150 --> 00:40:22,960

theologies

1107

00:40:28,150 --> 00:40:26,160

i do not my own theology does not does

1108

00:40:30,550 --> 00:40:28,160

not give me a conflict but that doesn't

1109

00:40:33,430 --> 00:40:30,560

mean that others might know

1110

00:40:34,309 --> 00:40:33,440

one of the big questions we can ask

1111

00:40:36,950 --> 00:40:34,319

is

1112

00:40:42,470 --> 00:40:36,960

and

1113

00:40:45,109 --> 00:40:42,480

god gave us responsibility for

1114

00:40:47,349 --> 00:40:45,119

the earth and the things in it so it

1115

00:40:49,750 --> 00:40:47,359

matters whether you think that

1116

00:40:51,990 --> 00:40:49,760

the earth is just the ground beneath our

1117

00:40:53,270 --> 00:40:52,000

feet and if martian ground were the

1118

00:40:55,190 --> 00:40:53,280

ground beneath our feet we'd be

1119

00:40:57,670 --> 00:40:55,200

responsible for that too

1120

00:41:00,470 --> 00:40:57,680

or if earth is a planet in which case

1121

00:41:03,750 --> 00:41:00,480

god sort of wanted us to be here

1122

00:41:07,190 --> 00:41:03,760

so does god want does god ask us to be

1123

00:41:08,790 --> 00:41:07,200

responsible for this place earth or does

1124

00:41:09,990 --> 00:41:08,800

god ask us to be responsible for the

1125

00:41:12,230 --> 00:41:10,000

universe

1126

00:41:14,230 --> 00:41:12,240

some have argued that theologically we

1127

00:41:16,230 --> 00:41:14,240

have an obligation for space travel

1128

00:41:18,230 --> 00:41:16,240

because being created in the image and

1129

00:41:22,470 --> 00:41:18,240

likeness of god only we can represent

1130

00:41:24,630 --> 00:41:22,480

god to other species or other planets

1131

00:41:25,750 --> 00:41:24,640

that might be going a little far for me

1132

00:41:27,750 --> 00:41:25,760

um

1133

00:41:29,270 --> 00:41:27,760

i i'm open to god working different ways

1134

00:41:31,829 --> 00:41:29,280

in different places

1135

00:41:33,990 --> 00:41:31,839

but i i think that

1136

00:41:36,069 --> 00:41:34,000

it is important

1137

00:41:38,069 --> 00:41:36,079

theologically or philosophically if you

1138

00:41:41,109 --> 00:41:38,079

if you're not inclined towards uh

1139

00:41:43,589 --> 00:41:41,119

religion per se to ask this question of

1140

00:41:47,510 --> 00:41:43,599

what are our obligations

1141

00:41:50,470 --> 00:41:47,520

beyond earth and do we have to meet our

1142

00:41:52,309 --> 00:41:50,480

earth obligations before we go elsewhere

1143

00:41:54,230 --> 00:41:52,319

um you know your parents probably told

1144

00:41:55,990 --> 00:41:54,240

you that you should like clean your room

1145

00:41:58,309 --> 00:41:56,000

before you go out and play

1146

00:41:59,510 --> 00:41:58,319

and uh i think that's probably a good

1147

00:42:01,910 --> 00:41:59,520

principle

1148

00:42:04,630 --> 00:42:01,920

um on the other hand space travel gives

1149

00:42:06,950 --> 00:42:04,640

us tools for cleaning up our planet in

1150

00:42:09,430 --> 00:42:06,960

new and creative ways so i don't think

1151

00:42:10,790 --> 00:42:09,440

there's an easy answer

1152

00:42:13,030 --> 00:42:10,800

i think that

1153

00:42:14,550 --> 00:42:13,040

we have to seriously talk about what

1154

00:42:18,230 --> 00:42:14,560

scripture

1155

00:42:20,150 --> 00:42:18,240

tells us how our relationship with god

1156

00:42:23,030 --> 00:42:20,160

impacts our relationship with the world

1157

00:42:25,349 --> 00:42:23,040

and vice versa and work through that and

1158

00:42:27,910 --> 00:42:25,359

most critically i think

1159

00:42:31,030 --> 00:42:27,920

i i honestly don't trust myself to do it

1160

00:42:33,510 --> 00:42:31,040

by myself and i got that from science

1161

00:42:36,069 --> 00:42:33,520

um although many of my my calvinist

1162

00:42:39,190 --> 00:42:36,079

friends got that from their christianity

1163

00:42:42,390 --> 00:42:39,200

i don't trust myself to reason by myself

1164

00:42:44,630 --> 00:42:42,400

i still reason for myself

1165

00:42:46,870 --> 00:42:44,640

but i need these communities to help me

1166

00:42:49,589 --> 00:42:46,880

work through all of the implications and

1167

00:42:51,990 --> 00:42:49,599

and call me when i'm being silly

1168

00:42:53,510 --> 00:42:52,000

so powerful aeronava who asked that

1169

00:42:55,510 --> 00:42:53,520

question is one of our interns i

1170

00:42:57,990 --> 00:42:55,520

mentioned this summer in the program the

1171

00:43:00,230 --> 00:42:58,000

young scientist program he and our other

1172

00:43:02,150 --> 00:43:00,240

interns there are 66 of them this summer

1173

00:43:04,069 --> 00:43:02,160

we'll all be taking part in a module

1174

00:43:06,069 --> 00:43:04,079

where they'll explore moral philosophy

1175

00:43:07,750 --> 00:43:06,079

and ethics and ethical frameworks that

1176

00:43:10,390 --> 00:43:07,760

we've used to ask just those kinds of

1177

00:43:12,870 --> 00:43:10,400

questions what do we owe each other how

1178

00:43:14,870 --> 00:43:12,880

are we to treat each other and how how

1179

00:43:16,710 --> 00:43:14,880

are we to treat the earth and space and

1180

00:43:18,230 --> 00:43:16,720

so you know it's really important and

1181

00:43:21,109 --> 00:43:18,240

powerful that we consider when we're

1182

00:43:22,790 --> 00:43:21,119

doing science and doing anything um the

1183

00:43:24,710 --> 00:43:22,800

ethical questions that come into the

1184

00:43:25,990 --> 00:43:24,720

things that we do in this world uh so

1185

00:43:27,990 --> 00:43:26,000

thank you so much for sharing that i'm

1186

00:43:30,309 --> 00:43:28,000

going to jump back to another question

1187

00:43:31,670 --> 00:43:30,319

from luis miguel rodriguez now

1188

00:43:35,510 --> 00:43:31,680

because it's a very fun one for

1189

00:43:36,950 --> 00:43:35,520

astrobiology in general um and and i i

1190

00:43:38,950 --> 00:43:36,960

want i'm curious to see which way which

1191

00:43:40,790 --> 00:43:38,960

direction you take it uh luisa's

1192

00:43:43,430 --> 00:43:40,800

question is what is the best way of

1193

00:43:46,230 --> 00:43:43,440

defining life

1194

00:43:56,790 --> 00:43:47,430

i

1195

00:43:59,670 --> 00:43:56,800

moss

1196

00:44:01,750 --> 00:43:59,680

and that life for me

1197

00:44:04,309 --> 00:44:01,760

is best defined by the process of

1198

00:44:07,109 --> 00:44:04,319

nutrition we both take stuff that's not

1199

00:44:09,190 --> 00:44:07,119

us and turn it into us

1200

00:44:13,109 --> 00:44:09,200

um which once you start thinking about

1201

00:44:15,510 --> 00:44:13,119

it philosophically is very weird

1202

00:44:17,750 --> 00:44:15,520

uh why is it when i eat a hamburger the

1203

00:44:19,750 --> 00:44:17,760

hamburger becomes me and i don't become

1204

00:44:20,870 --> 00:44:19,760

the hamburger

1205

00:44:23,030 --> 00:44:20,880

um

1206

00:44:27,349 --> 00:44:23,040

there's also a type of life which refers

1207

00:44:29,430 --> 00:44:27,359

to conscious experience of the world

1208

00:44:30,870 --> 00:44:29,440

and

1209

00:44:33,430 --> 00:44:30,880

i'm not really sure how to deal with

1210

00:44:35,589 --> 00:44:33,440

that it's a it's an i thou question and

1211

00:44:38,069 --> 00:44:35,599

i haven't haven't got a good description

1212

00:44:39,990 --> 00:44:38,079

yet um there's a type of life which is

1213

00:44:42,550 --> 00:44:40,000

being able to to

1214

00:44:44,150 --> 00:44:42,560

oh so so the important thing there is

1215

00:44:46,150 --> 00:44:44,160

when when people talk about the

1216

00:44:48,470 --> 00:44:46,160

beginning and end of human life they're

1217

00:44:49,589 --> 00:44:48,480

not talking about the beginning and end

1218

00:44:51,030 --> 00:44:49,599

of

1219

00:44:53,190 --> 00:44:51,040

we're talking about the beginning and

1220

00:44:55,750 --> 00:44:53,200

end of consciousness so i think it's

1221

00:44:57,829 --> 00:44:55,760

important to distinguish between

1222

00:44:59,430 --> 00:44:57,839

metabolism and consciousness which are

1223

00:45:01,190 --> 00:44:59,440

both very important

1224

00:45:02,870 --> 00:45:01,200

concepts of life

1225

00:45:05,589 --> 00:45:02,880

consciousness has something to do with

1226
00:45:07,750 --> 00:45:05,599
with personal identity and experience

1227
00:45:11,510 --> 00:45:07,760
there's rational life which is the

1228
00:45:12,390 --> 00:45:11,520
ability to like know things

1229
00:45:14,870 --> 00:45:12,400
um

1230
00:45:17,190 --> 00:45:14,880
and honestly i think that's necessary

1231
00:45:19,589 --> 00:45:17,200
for empiricism but can't be tackled

1232
00:45:21,030 --> 00:45:19,599
within the bounds of empiricism

1233
00:45:23,510 --> 00:45:21,040
um and so then you need to start talking

1234
00:45:24,550 --> 00:45:23,520
about minds or souls or something else

1235
00:45:26,069 --> 00:45:24,560
um

1236
00:45:28,870 --> 00:45:26,079
i think we have those i think those are

1237
00:45:30,550 --> 00:45:28,880
necessary to do good reasoning um and

1238
00:45:32,390 --> 00:45:30,560

they're just not the type of things

1239

00:45:33,910 --> 00:45:32,400

we're familiar with in

1240

00:45:35,510 --> 00:45:33,920

modern language so we have to be very

1241

00:45:37,910 --> 00:45:35,520

careful talking about them finally

1242

00:45:39,589 --> 00:45:37,920

there's spiritual life which is uh you

1243

00:45:41,030 --> 00:45:39,599

know to my mind participation in the

1244

00:45:43,109 --> 00:45:41,040

life of god

1245

00:45:45,589 --> 00:45:43,119

and that's a whole nother type of life

1246

00:45:48,710 --> 00:45:45,599

that's related to the first three and

1247

00:45:51,190 --> 00:45:48,720

very important but also very different

1248

00:45:52,790 --> 00:45:51,200

as i said that's participation uh you

1249

00:45:54,309 --> 00:45:52,800

know in christian and jewish parlance

1250

00:45:56,630 --> 00:45:54,319

it's breathing

1251
00:45:58,230 --> 00:45:56,640
but it's the idea that breathing isn't

1252
00:46:00,550 --> 00:45:58,240
just

1253
00:46:02,390 --> 00:46:00,560
moving molecules in and out of your body

1254
00:46:05,030 --> 00:46:02,400
it's also

1255
00:46:07,349 --> 00:46:05,040
sharing that same breath which is going

1256
00:46:10,230 --> 00:46:07,359
in and out of everyone else's body and

1257
00:46:13,030 --> 00:46:10,240
being part of a larger whole

1258
00:46:14,390 --> 00:46:13,040
so four different types of life all of

1259
00:46:16,710 --> 00:46:14,400
which i think are really important to

1260
00:46:17,990 --> 00:46:16,720
all of which we're looking for in space

1261
00:46:19,990 --> 00:46:18,000
um

1262
00:46:22,309 --> 00:46:20,000
but because it's my area of specialism

1263
00:46:23,710 --> 00:46:22,319

and because i'm an evolutionary theorist

1264

00:46:25,349 --> 00:46:23,720

um

1265

00:46:26,950 --> 00:46:25,359

astrobiologists are looking for

1266

00:46:29,349 --> 00:46:26,960

nutrition

1267

00:46:31,430 --> 00:46:29,359

um love it and there's so many ways for

1268

00:46:34,550 --> 00:46:31,440

us to explore what it means to be alive

1269

00:46:36,630 --> 00:46:34,560

what life is what consciousness is um

1270

00:46:38,710 --> 00:46:36,640

for myself i wonder one of my favorite

1271

00:46:41,750 --> 00:46:38,720

quotes from the the dune

1272

00:46:43,750 --> 00:46:41,760

series of novels is what senses do we

1273

00:46:45,030 --> 00:46:43,760

lack that we can't see a universe all

1274

00:46:46,630 --> 00:46:45,040

around us

1275

00:46:48,390 --> 00:46:46,640

i wonder do you think there's anything

1276

00:46:50,710 --> 00:46:48,400

that we are missing right now as a

1277

00:46:51,510 --> 00:46:50,720

species as a biosphere do you think

1278

00:46:53,109 --> 00:46:51,520

there's anything that we're really

1279

00:46:53,910 --> 00:46:53,119

missing that there might be some bigger

1280

00:46:55,589 --> 00:46:53,920

hole

1281

00:47:01,270 --> 00:46:55,599

to the universe that we just can't

1282

00:47:05,510 --> 00:47:03,510

i think i'll use humans as a metaphor

1283

00:47:07,990 --> 00:47:05,520

but i think this applies to species as

1284

00:47:10,230 --> 00:47:08,000

well and maybe planets

1285

00:47:11,910 --> 00:47:10,240

i don't think god would have made seven

1286

00:47:13,990 --> 00:47:11,920

eight billion of us if one of us would

1287

00:47:16,150 --> 00:47:14,000

have done

1288

00:47:18,950 --> 00:47:16,160

which means that their their unique

1289

00:47:20,230 --> 00:47:18,960

perspective to every location in the

1290

00:47:23,349 --> 00:47:20,240

universe

1291

00:47:25,829 --> 00:47:23,359

and our goal in life is not to

1292

00:47:27,750 --> 00:47:25,839

find the best perspective

1293

00:47:30,390 --> 00:47:27,760

but to share the perspectives and put

1294

00:47:32,630 --> 00:47:30,400

them all together

1295

00:47:36,150 --> 00:47:32,640

i also think that you can't really know

1296

00:47:37,270 --> 00:47:36,160

yourself until you know someone else

1297

00:47:39,829 --> 00:47:37,280

and so

1298

00:47:42,630 --> 00:47:39,839

another species particularly sorry like

1299

00:47:45,030 --> 00:47:42,640

another biosphere um or uh another

1300

00:47:47,430 --> 00:47:45,040

intelligent species

1301
00:47:49,030 --> 00:47:47,440
would tell us so much about ourselves

1302
00:47:51,430 --> 00:47:49,040
that we can't see because we're too

1303
00:47:53,349 --> 00:47:51,440
close to it

1304
00:47:55,430 --> 00:47:53,359
yeah absolutely that's like comparative

1305
00:47:57,589 --> 00:47:55,440
planetology it has taught us so much

1306
00:48:00,950 --> 00:47:57,599
more about our own world and so

1307
00:48:02,870 --> 00:48:00,960
comparative astrobiology if we had an

1308
00:48:04,309 --> 00:48:02,880
example two or example three example

1309
00:48:06,710 --> 00:48:04,319
four of life that really starts giving

1310
00:48:08,630 --> 00:48:06,720
us some ways of exploring not just you

1311
00:48:09,990 --> 00:48:08,640
know the science the physical nature of

1312
00:48:11,510 --> 00:48:10,000
our makeup and the matter of the

1313
00:48:13,510 --> 00:48:11,520

universe but also

1314

00:48:16,230 --> 00:48:13,520

other topics in consciousness and

1315

00:48:17,349 --> 00:48:16,240

understanding um where we come from

1316

00:48:19,270 --> 00:48:17,359

um

1317

00:48:21,510 --> 00:48:19,280

intellectual i want to say it's it's

1318

00:48:25,349 --> 00:48:21,520

emotional and spiritual too

1319

00:48:28,630 --> 00:48:27,510

uh we have a question from marina ripan

1320

00:48:30,630 --> 00:48:28,640

on youtube

1321

00:48:33,430 --> 00:48:30,640

uh marina has said what are the things

1322

00:48:35,589 --> 00:48:33,440

that help unite science and religion

1323

00:48:39,030 --> 00:48:35,599

how much are both open to each other and

1324

00:48:42,150 --> 00:48:40,630

it's entirely possible to have a

1325

00:48:43,349 --> 00:48:42,160

theology that tells you to ignore

1326

00:48:45,510 --> 00:48:43,359

science

1327

00:48:48,630 --> 00:48:45,520

um i'm comfortable saying from my

1328

00:48:50,470 --> 00:48:48,640

perspective that's a bad theology um but

1329

00:48:51,829 --> 00:48:50,480

you have to make your your value

1330

00:48:52,549 --> 00:48:51,839

judgments there

1331

00:48:54,870 --> 00:48:52,559

so

1332

00:48:56,790 --> 00:48:54,880

i think that

1333

00:48:59,510 --> 00:48:56,800

most of the major world

1334

00:49:01,270 --> 00:48:59,520

all of the major world religions

1335

00:49:05,030 --> 00:49:01,280

definitely have strands within them that

1336

00:49:07,750 --> 00:49:05,040

say we have been called upon to know

1337

00:49:10,309 --> 00:49:07,760

as best we can know and science is one

1338

00:49:13,589 --> 00:49:10,319

of the best ways of knowing

1339

00:49:16,549 --> 00:49:13,599

i think that that as a christian hope

1340

00:49:18,870 --> 00:49:16,559

faith and charity line up very well

1341

00:49:20,549 --> 00:49:18,880

with curiosity

1342

00:49:21,510 --> 00:49:20,559

uh discovery

1343

00:49:23,190 --> 00:49:21,520

uh

1344

00:49:25,109 --> 00:49:23,200

and and engagement

1345

00:49:26,710 --> 00:49:25,119

and so for me

1346

00:49:29,589 --> 00:49:26,720

science and

1347

00:49:30,790 --> 00:49:29,599

theology are deeply integrated for those

1348

00:49:32,470 --> 00:49:30,800

of you who are particularly interested

1349

00:49:34,790 --> 00:49:32,480

margaret osler has a book on the

1350

00:49:35,750 --> 00:49:34,800

foundations of the modern philosophy of

1351
00:49:37,589 --> 00:49:35,760
science

1352
00:49:38,630 --> 00:49:37,599
and why this was originally a theology

1353
00:49:40,630 --> 00:49:38,640
discussion

1354
00:49:43,030 --> 00:49:40,640
um

1355
00:49:44,950 --> 00:49:43,040
of course they go together because

1356
00:49:47,829 --> 00:49:44,960
we are all people dealing with the same

1357
00:49:49,109 --> 00:49:47,839
world and trying to figure it out

1358
00:49:51,030 --> 00:49:49,119
fantastic

1359
00:49:53,589 --> 00:49:51,040
um we have a question from rendering

1360
00:49:55,589 --> 00:49:53,599
reality 3d animations which we're pretty

1361
00:49:58,630 --> 00:49:55,599
sure is our friend tom caruso a long

1362
00:50:01,349 --> 00:49:58,640
time viewer of the show as well um

1363
00:50:03,270 --> 00:50:01,359

and it might be a loaded question um i

1364

00:50:05,510 --> 00:50:03,280

will see how you want to answer this

1365

00:50:08,069 --> 00:50:05,520

how do we merge an open-minded pursuit

1366

00:50:09,829 --> 00:50:08,079

of science with a balanced set of morals

1367

00:50:17,109 --> 00:50:09,839

and a strong faith

1368

00:50:21,910 --> 00:50:19,109

i am

1369

00:50:23,750 --> 00:50:21,920

very much on the fence on this question

1370

00:50:26,470 --> 00:50:23,760

i think that

1371

00:50:29,349 --> 00:50:26,480

there is an ideal of value-free

1372

00:50:31,270 --> 00:50:29,359

objectivity in science

1373

00:50:34,230 --> 00:50:31,280

and the important thing for me has been

1374

00:50:35,910 --> 00:50:34,240

the realization that that is an ideal

1375

00:50:38,470 --> 00:50:35,920

it will never be perfectly achieved

1376

00:50:40,870 --> 00:50:38,480

which means we must always struggle to

1377

00:50:41,990 --> 00:50:40,880

be better at it

1378

00:50:42,790 --> 00:50:42,000

but

1379

00:50:47,190 --> 00:50:42,800

as

1380

00:50:49,750 --> 00:50:47,200

this is perfectly straightforward for me

1381

00:50:52,069 --> 00:50:49,760

the church is inherently messed up

1382

00:50:53,430 --> 00:50:52,079

because we are limited created

1383

00:50:54,790 --> 00:50:53,440

beings

1384

00:50:57,270 --> 00:50:54,800

and so

1385

00:51:01,510 --> 00:50:57,280

theology as well is this

1386

00:51:03,109 --> 00:51:01,520

ideal enterprise that we want to do well

1387

00:51:04,870 --> 00:51:03,119

but we'll only do it well if we

1388

00:51:06,470 --> 00:51:04,880

constantly recognize that we're not

1389

00:51:07,349 --> 00:51:06,480

there yet

1390

00:51:09,829 --> 00:51:07,359

so

1391

00:51:12,630 --> 00:51:09,839

i think that science is an ideal i think

1392

00:51:14,230 --> 00:51:12,640

the ideals of objectivity

1393

00:51:16,230 --> 00:51:14,240

and um

1394

00:51:19,270 --> 00:51:16,240

impartiality are just

1395

00:51:21,349 --> 00:51:19,280

so important as long as we don't use

1396

00:51:23,990 --> 00:51:21,359

them as excuses to think that we're

1397

00:51:25,670 --> 00:51:24,000

already unbiased

1398

00:51:28,870 --> 00:51:25,680

and therefore don't need to work at it

1399

00:51:29,910 --> 00:51:28,880

anymore that's when science goes wrong

1400

00:51:32,309 --> 00:51:29,920

intriguing

1401

00:51:34,069 --> 00:51:32,319

um we have one more question here from

1402

00:51:37,349 --> 00:51:34,079

one of our production assistants anna

1403

00:51:38,790 --> 00:51:37,359

root mohanty um anur asks as a christian

1404

00:51:40,790 --> 00:51:38,800

with an educational background in

1405

00:51:42,950 --> 00:51:40,800

evolutionary biology what do you

1406

00:51:44,470 --> 00:51:42,960

consider truth if some information is

1407

00:51:47,190 --> 00:51:44,480

contradictory

1408

00:51:51,510 --> 00:51:47,200

um so and and maybe he concludes how do

1409

00:51:57,349 --> 00:51:55,589

uh strictly speaking i prioritize

1410

00:51:59,190 --> 00:51:57,359

beliefs in which i have strong

1411

00:52:00,549 --> 00:51:59,200

confidence

1412

00:52:02,950 --> 00:52:00,559

so

1413

00:52:04,549 --> 00:52:02,960

if if we say the word truth we're

1414

00:52:06,710 --> 00:52:04,559

already committed to knowing it and

1415

00:52:08,069 --> 00:52:06,720

there's there's a few things in my in my

1416

00:52:10,950 --> 00:52:08,079

religious faith that i'll go ahead and

1417

00:52:12,549 --> 00:52:10,960

say i know like i i know god exists i

1418

00:52:15,190 --> 00:52:12,559

know god loves me i recognize other

1419

00:52:17,349 --> 00:52:15,200

people don't know those

1420

00:52:19,349 --> 00:52:17,359

in the way that i do um and that gives

1421

00:52:21,430 --> 00:52:19,359

me pause but um

1422

00:52:23,430 --> 00:52:21,440

most of my beliefs both in religion and

1423

00:52:25,510 --> 00:52:23,440

science are just things in which i have

1424

00:52:28,390 --> 00:52:25,520

strong confidence

1425

00:52:30,710 --> 00:52:28,400

and the question is how do i assess how

1426

00:52:33,109 --> 00:52:30,720

much confidence i have

1427

00:52:35,270 --> 00:52:33,119

so i'll do a quick plug i have a book

1428

00:52:36,790 --> 00:52:35,280

called thinking fair rules for reason in

1429

00:52:39,270 --> 00:52:36,800

science and religion

1430

00:52:41,030 --> 00:52:39,280

uh and i break down sort of

1431

00:52:42,950 --> 00:52:41,040

why i have confidence in some things and

1432

00:52:44,710 --> 00:52:42,960

why not others and how to measure that

1433

00:52:46,870 --> 00:52:44,720

and how that lines up with with a thing

1434

00:52:49,030 --> 00:52:46,880

called credence which is

1435

00:52:50,069 --> 00:52:49,040

how strongly my beliefs affect my

1436

00:52:52,309 --> 00:52:50,079

behavior

1437

00:52:54,150 --> 00:52:52,319

and how we get the strength of our

1438

00:52:55,430 --> 00:52:54,160

belief to match the strength of our

1439

00:52:58,549 --> 00:52:55,440

confidence

1440

00:53:00,230 --> 00:52:58,559

uh is a very tough question

1441

00:53:01,750 --> 00:53:00,240

that's very powerful i i don't know if

1442

00:53:03,109 --> 00:53:01,760

we had a link to plug for the book but

1443

00:53:05,270 --> 00:53:03,119

we'll definitely find that for after the

1444

00:53:07,990 --> 00:53:05,280

episode to share with our audience as

1445

00:53:10,069 --> 00:53:08,000

well um so just a few more minutes here

1446

00:53:11,430 --> 00:53:10,079

um for myself so so you know this is

1447

00:53:13,829 --> 00:53:11,440

something obviously you know our viewers

1448

00:53:16,309 --> 00:53:13,839

are very intrigued by by maybe science

1449

00:53:18,549 --> 00:53:16,319

versus religion science and religion

1450

00:53:21,270 --> 00:53:18,559

kind of these comparisons if you could

1451

00:53:23,829 --> 00:53:21,280

moderate a conversation with any

1452

00:53:25,190 --> 00:53:23,839

luminaries any scholars from any time in

1453

00:53:27,589 --> 00:53:25,200

human history

1454

00:53:30,630 --> 00:53:27,599

to have this conversation of how we how

1455

00:53:32,870 --> 00:53:30,640

we build forward in religion and science

1456

00:53:34,710 --> 00:53:32,880

and understanding what kinds of people

1457

00:53:36,870 --> 00:53:34,720

or who maybe would you want to bring

1458

00:53:39,589 --> 00:53:36,880

together to that conversation to

1459

00:53:41,510 --> 00:53:39,599

moderate the the world conversation of

1460

00:53:43,430 --> 00:53:41,520

humans um to help us find the way

1461

00:53:44,150 --> 00:53:43,440

forward

1462

00:53:50,150 --> 00:53:44,160

it's

1463

00:53:52,150 --> 00:53:50,160

i really want to talk to the people that

1464

00:53:53,910 --> 00:53:52,160

i haven't heard from

1465

00:53:55,589 --> 00:53:53,920

um so

1466

00:53:56,790 --> 00:53:55,599

unfortunately

1467

00:53:58,630 --> 00:53:56,800

um

1468

00:54:00,710 --> 00:53:58,640

both the science conversation and the

1469

00:54:04,390 --> 00:54:00,720

theology conversation have been

1470

00:54:06,230 --> 00:54:04,400

dominated by people in power

1471

00:54:07,910 --> 00:54:06,240

and so it'd be very interesting to reach

1472

00:54:10,549 --> 00:54:07,920

out to some of those people who were not

1473

00:54:12,150 --> 00:54:10,559

allowed to speak for themselves

1474

00:54:13,270 --> 00:54:12,160

historically

1475

00:54:16,230 --> 00:54:13,280

um

1476
00:54:19,670 --> 00:54:16,240
there is a uh a theologian by the name

1477
00:54:21,829 --> 00:54:19,680
of uh macrena from ancient greece

1478
00:54:23,829 --> 00:54:21,839
and um

1479
00:54:26,790 --> 00:54:23,839
her brother wrote a whole lot of very

1480
00:54:27,829 --> 00:54:26,800
popular theology um so we get a little

1481
00:54:29,109 --> 00:54:27,839
bit of her

1482
00:54:31,349 --> 00:54:29,119
but um

1483
00:54:32,950 --> 00:54:31,359
so i would like to get some of those

1484
00:54:34,950 --> 00:54:32,960
voices

1485
00:54:36,950 --> 00:54:34,960
i think

1486
00:54:39,589 --> 00:54:36,960
i would be really interested

1487
00:54:41,190 --> 00:54:39,599
this category of science as a modern

1488
00:54:42,390 --> 00:54:41,200

category

1489

00:54:45,030 --> 00:54:42,400

and so

1490

00:54:46,870 --> 00:54:45,040

figuring out how different people in

1491

00:54:49,030 --> 00:54:46,880

different places and times have sliced

1492

00:54:51,109 --> 00:54:49,040

up the world differently

1493

00:54:53,030 --> 00:54:51,119

is really important to me and i'm i'm

1494

00:54:54,630 --> 00:54:53,040

hoping uh those of you in the audience

1495

00:54:56,549 --> 00:54:54,640

can hope with me to get a grant that

1496

00:54:58,710 --> 00:54:56,559

will allow us to do uh some

1497

00:55:00,789 --> 00:54:58,720

international dialogue

1498

00:55:03,030 --> 00:55:00,799

and see how different cultures address

1499

00:55:05,109 --> 00:55:03,040

the science religion question that's

1500

00:55:07,030 --> 00:55:05,119

fantastic i mean we had natural history

1501
00:55:09,030 --> 00:55:07,040
and natural philosophy and then we had

1502
00:55:10,710 --> 00:55:09,040
you know science kind of being born and

1503
00:55:12,549 --> 00:55:10,720
then we had science being cut down

1504
00:55:14,390 --> 00:55:12,559
itself into smaller disciplines and

1505
00:55:15,910 --> 00:55:14,400
sub-disciplines and sub-sub-disciplines

1506
00:55:18,390 --> 00:55:15,920
and it's one thing i love in

1507
00:55:20,470 --> 00:55:18,400
astrobiology is it brings things kind of

1508
00:55:22,069 --> 00:55:20,480
back together and i feel like right now

1509
00:55:25,349 --> 00:55:22,079
we're at this place where a lot of us

1510
00:55:27,430 --> 00:55:25,359
are recognizing the need to bring things

1511
00:55:30,710 --> 00:55:27,440
back together and try to start having a

1512
00:55:32,549 --> 00:55:30,720
wider world view in science and theology

1513
00:55:36,789 --> 00:55:32,559

and philosophy and spirituality and

1514

00:55:38,630 --> 00:55:36,799

other realms so i love that so much

1515

00:55:40,789 --> 00:55:38,640

i think we are going to end our episode

1516

00:55:42,789 --> 00:55:40,799

here in one moment uh if there is any

1517

00:55:44,549 --> 00:55:42,799

single message you would like to share

1518

00:55:46,589 --> 00:55:44,559

with younger people or people of the

1519

00:55:49,670 --> 00:55:46,599

world who want to pursue

1520

00:55:52,309 --> 00:55:49,680

astrobiology from both science as well

1521

00:55:54,870 --> 00:55:52,319

as theology or other realms what what

1522

00:55:57,910 --> 00:55:54,880

message would you share with them

1523

00:56:00,390 --> 00:55:57,920

don't stop asking questions

1524

00:56:02,710 --> 00:56:00,400

fantastic reverend dr lucas mix thank

1525

00:56:04,150 --> 00:56:02,720

you so much for joining us for ask an

1526
00:56:05,910 --> 00:56:04,160
astrobiologist it's been a pleasure

1527
00:56:07,589 --> 00:56:05,920
having you on the show

1528
00:56:09,430 --> 00:56:07,599
joy to be here

1529
00:56:11,349 --> 00:56:09,440
and for all of our our guests watching

1530
00:56:13,670 --> 00:56:11,359
right now on youtube or watching the

1531
00:56:16,150 --> 00:56:13,680
recording later on uh it's a pleasure

1532
00:56:17,430 --> 00:56:16,160
having all of you join us as always you

1533
00:56:20,390 --> 00:56:17,440
can always reach out and ask us

1534
00:56:22,109 --> 00:56:20,400
questions using the hashtag askastrobio

1535
00:56:24,630 --> 00:56:22,119
on twitter you can find me at

1536
00:56:28,710 --> 00:56:24,640
cosmobiologist uh you can find us at

1537
00:56:30,549 --> 00:56:28,720
sagan.org as well as at nasa astrobio

1538
00:56:32,390 --> 00:56:30,559

and always you can ask questions in the

1539

00:56:34,549 --> 00:56:32,400

chat as well in the comments section on

1540

00:56:35,910 --> 00:56:34,559

youtube videos i'm always checking those

1541

00:56:38,069 --> 00:56:35,920

out and trying my best to respond as

1542

00:56:40,309 --> 00:56:38,079

soon as i can uh so for all of you

1543

00:56:43,030 --> 00:56:40,319

joining out there uh for dr reverend

1544

00:56:48,340 --> 00:56:43,040

lucas mix for joining us uh thank you so