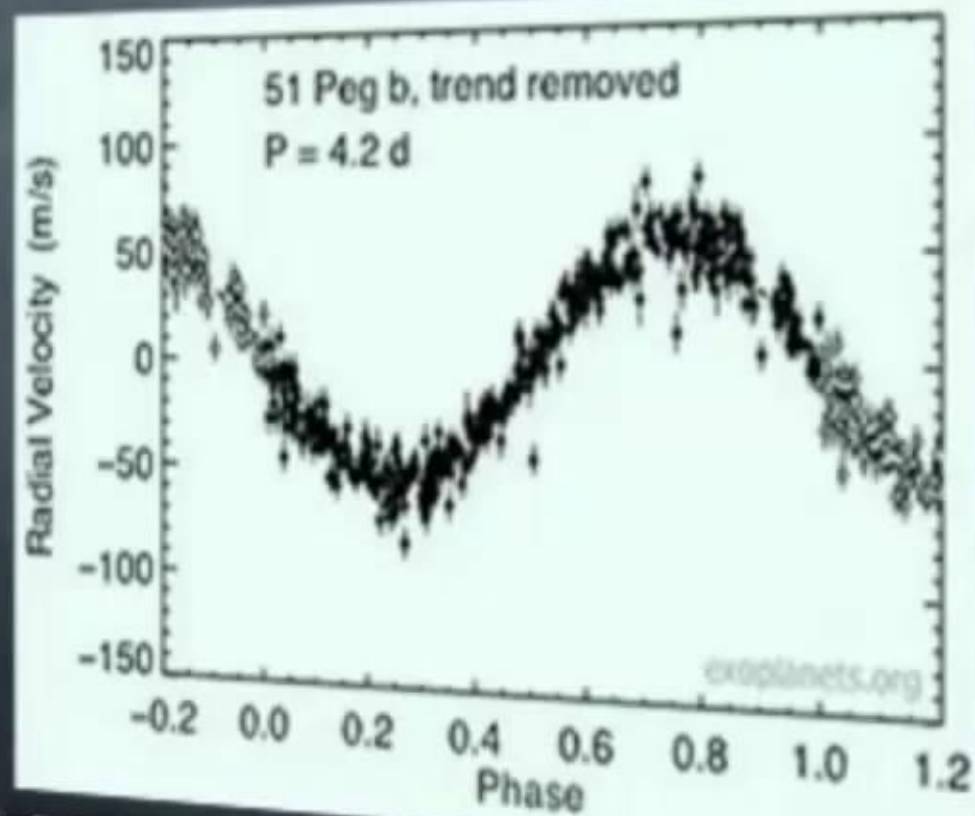


My advisor and first exoplanet



1
00:00:12,799 --> 00:00:08,629
so if you just write down the link bit

2
00:00:15,039 --> 00:00:12,809
that lee / 10 like the letter 3k 7 p-7

3
00:00:18,590 --> 00:00:15,049
that's where I've uploaded a lot of

4
00:00:20,630 --> 00:00:18,600
videos my syllabus the you know all

5
00:00:22,490 --> 00:00:20,640
sorts of just resources on teaching and

6
00:00:24,050 --> 00:00:22,500
so there's a whole little drop box

7
00:00:26,929 --> 00:00:24,060
that's about a gigabyte big I'm only

8
00:00:28,880 --> 00:00:26,939
going to leave it up for about a week so

9
00:00:30,980 --> 00:00:28,890
you should pull the materials down if

10
00:00:36,319 --> 00:00:30,990
you want them sooner rather than later

11
00:00:38,750 --> 00:00:36,329
is my advice on that okay sounds good

12
00:00:42,380 --> 00:00:38,760
it's also at the end you know okay um

13
00:00:43,490 --> 00:00:42,390

yes so the first thing when I like kind

14

00:00:45,560 --> 00:00:43,500

of lessons when I thought about like

15

00:00:48,200 --> 00:00:45,570

what made the course successful I think

16

00:00:49,729 --> 00:00:48,210

is and like everyone knows this but I'm

17

00:00:51,560 --> 00:00:49,739

just going to say it again is to make it

18

00:00:53,270 --> 00:00:51,570

relevant make it relevant to their lives

19

00:00:56,119 --> 00:00:53,280

make it relevant you know bring up

20

00:01:00,319 --> 00:00:56,129

current science discussions bring up you

21

00:01:02,060 --> 00:01:00,329

know science in the media and various

22

00:01:03,920 --> 00:01:02,070

things and that'll make them a lot more

23

00:01:06,890 --> 00:01:03,930

interested in hearing what you have to

24

00:01:09,890 --> 00:01:06,900

say also astrobiology great way to

25

00:01:12,140 --> 00:01:09,900

connect all the sciences right so

26

00:01:14,870 --> 00:01:12,150

connect all the sciences show them the

27

00:01:17,690 --> 00:01:14,880

process of science and how and how that

28

00:01:20,560 --> 00:01:17,700

happens I mean it also in courses like

29

00:01:23,240 --> 00:01:20,570

this I feel like this might be the last

30

00:01:27,890 --> 00:01:23,250

science course they ever take in their

31

00:01:29,810 --> 00:01:27,900

life so take that seriously you know I

32

00:01:32,690 --> 00:01:29,820

think it's far less important that they

33

00:01:34,690 --> 00:01:32,700

learn astrobiology and instead that they

34

00:01:38,719 --> 00:01:34,700

learn the process of science and able to

35

00:01:41,420 --> 00:01:38,729

you know skeptically look at you know

36

00:01:42,710 --> 00:01:41,430

claims you know pro and against things

37

00:01:45,859 --> 00:01:42,720

in the media when they're making their

38

00:01:48,440 --> 00:01:45,869

decisions and I would say don't let this

39

00:01:51,109 --> 00:01:48,450

guy is a typo don't shy don't shy away

40

00:01:53,810 --> 00:01:51,119

from life lessons because again this is

41

00:01:54,980 --> 00:01:53,820

you know this is a your one chance to

42

00:01:57,200 --> 00:01:54,990

connect with these students and your

43

00:01:59,810 --> 00:01:57,210

mentor to them so you know don't shy

44

00:02:02,389 --> 00:01:59,820

away from talking about various things

45

00:02:04,520 --> 00:02:02,399

that they might find useful in addition

46

00:02:06,859 --> 00:02:04,530

to the science which I'll talk about at

47

00:02:08,510 --> 00:02:06,869

the end so the first thing with

48

00:02:10,160 --> 00:02:08,520

scientific literacy is I think you need

49

00:02:13,220 --> 00:02:10,170

to realize that most people have

50

00:02:13,460 --> 00:02:13,230

misconceptions way more basic than what

51

00:02:16,430 --> 00:02:13,470

you

52

00:02:18,260 --> 00:02:16,440

think way more basic so for example

53

00:02:19,870 --> 00:02:18,270

twenty-five percent of americans don't

54

00:02:21,950 --> 00:02:19,880

know that the Earth orbits the Sun and

55

00:02:23,900 --> 00:02:21,960

yes I have interviewed one of these

56

00:02:24,950 --> 00:02:23,910

people so I didn't even I wasn't even

57

00:02:28,010 --> 00:02:24,960

aware that this was a common

58

00:02:29,420 --> 00:02:28,020

misconception until I did what's called

59

00:02:31,700 --> 00:02:29,430

an informational interview which I

60

00:02:34,760 --> 00:02:31,710

highly recommend you do you basically

61

00:02:36,650 --> 00:02:34,770

find a friend you know our parent or you

62

00:02:39,440 --> 00:02:36,660

know friend in a different field than

63

00:02:41,570 --> 00:02:39,450

you and you just probe what they know

64

00:02:44,120 --> 00:02:41,580

about something I was probing about the

65

00:02:46,220 --> 00:02:44,130

seasons and about the orbit of the Sun

66

00:02:48,199 --> 00:02:46,230

and I even gave the answer away to this

67

00:02:51,320 --> 00:02:48,209

person I was interviewing I said we know

68

00:02:52,699 --> 00:02:51,330

the Earth orbits the Sun please draw for

69

00:02:55,160 --> 00:02:52,709

me what that looks like and to his

70

00:02:56,990 --> 00:02:55,170

credit he did not trust what I told him

71

00:02:59,000 --> 00:02:57,000

he said oh no no I don't think the Earth

72

00:03:01,070 --> 00:02:59,010

orbits a Sun I was like oh really tell

73

00:03:02,510 --> 00:03:01,080

me more you know and he was like I think

74

00:03:04,130 --> 00:03:02,520

the earth is out here and he drew this

75

00:03:05,720 --> 00:03:04,140

picture for me it's great to have them

76

00:03:07,160 --> 00:03:05,730

draw pictures because you there they

77

00:03:09,230 --> 00:03:07,170

actually have to like think about it and

78

00:03:10,820 --> 00:03:09,240

kind of draw their schematic so you know

79

00:03:13,550 --> 00:03:10,830

you have some scrap pick your scrap

80

00:03:14,960 --> 00:03:13,560

paper he drew the earth like here and

81

00:03:16,280 --> 00:03:14,970

he's like maybe goes a little to the

82

00:03:18,350 --> 00:03:16,290

left or to the right but the year is

83

00:03:21,290 --> 00:03:18,360

caused by the rotation of the earth that

84

00:03:23,120 --> 00:03:21,300

was his you know imagining of it and

85

00:03:24,560 --> 00:03:23,130

furthermore previously about 20 minutes

86

00:03:26,030 --> 00:03:24,570

before that an interview when I had

87

00:03:27,710 --> 00:03:26,040

asked about the seasons he drew like the

88

00:03:29,870 --> 00:03:27,720

Sun and the earth down here with the

89

00:03:31,490 --> 00:03:29,880

northern hemisphere pointed towards the

90

00:03:34,340 --> 00:03:31,500

Sun and the southern hemisphere here and

91

00:03:36,380 --> 00:03:34,350

the earth was rotating kind of on its

92

00:03:38,150 --> 00:03:36,390

top like that to describe the season's

93

00:03:42,130 --> 00:03:38,160

end so he had described the day the

94

00:03:44,930 --> 00:03:42,140

earth the year and the seasons all by

95

00:03:48,830 --> 00:03:44,940

the rotation and it was just a very

96

00:03:50,600 --> 00:03:48,840

complicated rotation in his brain so you

97

00:03:52,039 --> 00:03:50,610

need to know that and then yeah so 55

98

00:03:53,660 --> 00:03:52,049

and fifty percent of americans don't

99

00:03:55,699 --> 00:03:53,670

know that it takes a year to go around

100

00:03:58,870 --> 00:03:55,709

so when you're in your classes like you

101
00:04:01,780 --> 00:03:58,880
need to wo d scope and and realize that

102
00:04:04,190 --> 00:04:01,790
your students might have these things

103
00:04:06,080 --> 00:04:04,200
and yet and even less understand the

104
00:04:10,430 --> 00:04:06,090
seasons or evolution so i uploaded these

105
00:04:12,050 --> 00:04:10,440
two videos in the link yes they're

106
00:04:13,670 --> 00:04:12,060
really good i highly recommend about

107
00:04:15,259 --> 00:04:13,680
like teaching methodology but it's a

108
00:04:16,460 --> 00:04:15,269
private university of mainz of our own

109
00:04:18,949 --> 00:04:16,470
it's really great because it makes one

110
00:04:21,140 --> 00:04:18,959
of harvard students where they ask them

111
00:04:23,839 --> 00:04:21,150
to you know graduating seniors to

112
00:04:25,460 --> 00:04:23,849
describe the seasons and like no one

113
00:04:26,780 --> 00:04:25,470

knows how to do it and

114

00:04:28,940 --> 00:04:26,790

in physics majors he's like yeah I took

115

00:04:30,680 --> 00:04:28,950

general relativity blah blah blah and

116

00:04:33,470 --> 00:04:30,690

the seasons are this and it was

117

00:04:35,410 --> 00:04:33,480

completely wrong so I i highly recommend

118

00:04:38,090 --> 00:04:35,420

you know watching these videos and and

119

00:04:40,340 --> 00:04:38,100

considering that you need to know what

120

00:04:42,620 --> 00:04:40,350

your students don't know or what their

121

00:04:45,200 --> 00:04:42,630

misunderstanding before you can actually

122

00:04:47,450 --> 00:04:45,210

teach them and so often it as teachers

123

00:04:50,240 --> 00:04:47,460

we think of students and children as

124

00:04:53,000 --> 00:04:50,250

like these open vessels ready for our

125

00:04:55,700 --> 00:04:53,010

knowledge you know but they're not they

126
00:04:58,730 --> 00:04:55,710
have conceptions of how the world works

127
00:05:01,670 --> 00:04:58,740
and you know they have experiences and

128
00:05:04,850 --> 00:05:01,680
until you show them why their idea

129
00:05:07,550 --> 00:05:04,860
doesn't work for the seasons they will

130
00:05:09,200 --> 00:05:07,560
never take in new information that's

131
00:05:12,320 --> 00:05:09,210
like the big takeaway from those two

132
00:05:14,120 --> 00:05:12,330
videos yeah and then also I think

133
00:05:15,740 --> 00:05:14,130
understanding the process of science is

134
00:05:17,540 --> 00:05:15,750
really good I for my course I used

135
00:05:19,400 --> 00:05:17,550
Robert hazen's books two of his books

136
00:05:21,350 --> 00:05:19,410
and I think he really does a good job of

137
00:05:24,440 --> 00:05:21,360
showing like how our scientific

138
00:05:25,760 --> 00:05:24,450

processes or how science done like how

139

00:05:27,320 --> 00:05:25,770

is the question asked what are the

140

00:05:29,240 --> 00:05:27,330

obstacles along the way how does this

141

00:05:31,520 --> 00:05:29,250

lead to new questions and to me that's

142

00:05:33,230 --> 00:05:31,530

how I learned like the process of

143

00:05:37,310 --> 00:05:33,240

science was just basically kind of

144

00:05:42,800 --> 00:05:37,320

reading historical science sort of been

145

00:05:44,570 --> 00:05:42,810

yet again similarly but this is more of

146

00:05:46,690 --> 00:05:44,580

like a philosophical religious point

147

00:05:50,950 --> 00:05:46,700

don't ignore what your students believe

148

00:05:53,600 --> 00:05:50,960

so you know human so when when people I

149

00:05:55,670 --> 00:05:53,610

think this is actually the opposite of

150

00:05:57,530 --> 00:05:55,680

what I said here human beings as we know

151
00:05:58,700 --> 00:05:57,540
them today develop from earlier species

152
00:06:02,480 --> 00:05:58,710
forty-eight percent that was true

153
00:06:04,670 --> 00:06:02,490
there's a major political divide oh yeah

154
00:06:06,110 --> 00:06:04,680
here and then but if you ask them if you

155
00:06:08,090 --> 00:06:06,120
just change if you say according to the

156
00:06:09,680 --> 00:06:08,100
theory of evolution so this is not about

157
00:06:13,520 --> 00:06:09,690
what I believe but what does the theory

158
00:06:14,480 --> 00:06:13,530
say then 71 % say it's true you know

159
00:06:16,100 --> 00:06:14,490
that point to the theory of evolution

160
00:06:18,460 --> 00:06:16,110
human beings as we know them today

161
00:06:20,480 --> 00:06:18,470
develop from our earlier species and

162
00:06:21,860 --> 00:06:20,490
Republicans actually had a much higher

163
00:06:23,390 --> 00:06:21,870

percent of that being correct though

164

00:06:25,520 --> 00:06:23,400

they had a lower percent of leaving it

165

00:06:27,350 --> 00:06:25,530

was true so they were more aware of what

166

00:06:29,060 --> 00:06:27,360

the correct theory is so you when you're

167

00:06:31,640 --> 00:06:29,070

teaching you need to again show them why

168

00:06:34,820 --> 00:06:31,650

we think this why do we think evolution

169

00:06:36,409 --> 00:06:34,830

because otherwise they'll answer the

170

00:06:39,760 --> 00:06:36,419

correct answer on the test but they

171

00:06:42,529 --> 00:06:39,770

might not like actually take it to heart

172

00:06:43,999 --> 00:06:42,539

and so the basic outline of my course is

173

00:06:45,350 --> 00:06:44,009

I decide you could you teach gesture

174

00:06:46,969 --> 00:06:45,360

biology a whole number of ways because

175

00:06:49,249 --> 00:06:46,979

there's so many topics but this is what

176

00:06:51,860 --> 00:06:49,259

I settled on as I did half on prebiotic

177

00:06:53,480 --> 00:06:51,870

chemistry and half on finding life in

178

00:06:56,300 --> 00:06:53,490

the outer solar system on other planets

179

00:06:58,100 --> 00:06:56,310

and I used these two books for the first

180

00:06:59,540 --> 00:06:58,110

part the story of Earth and Genesis by

181

00:07:02,360 --> 00:06:59,550

Robert Hazen I really like them because

182

00:07:04,040 --> 00:07:02,370

of the process of science and then for

183

00:07:06,529 --> 00:07:04,050

the second half I used how to find a

184

00:07:08,300 --> 00:07:06,539

habitable planet by Jim casting and then

185

00:07:10,909 --> 00:07:08,310

just like my own research because that's

186

00:07:13,189 --> 00:07:10,919

what I'm interested in and in for the

187

00:07:15,110 --> 00:07:13,199

like general course outline i decided to

188

00:07:17,899 --> 00:07:15,120

do half of the course being activities

189

00:07:21,290 --> 00:07:17,909

half the course you know discussions

190

00:07:24,920 --> 00:07:21,300

debates in class labs sort of thing in

191

00:07:27,469 --> 00:07:24,930

half the class was lectures and and that

192

00:07:29,959 --> 00:07:27,479

you dub astrobiology activities magnet

193

00:07:33,559 --> 00:07:29,969

which i uploaded to the dropbox has a

194

00:07:35,209 --> 00:07:33,569

huge array of activities already just

195

00:07:37,790 --> 00:07:35,219

ready for you you don't even need to do

196

00:07:39,529 --> 00:07:37,800

the work and we discussed you know other

197

00:07:41,570 --> 00:07:39,539

such articles in like astrobiology

198

00:07:44,209 --> 00:07:41,580

journal like on the moral status of ET

199

00:07:45,920 --> 00:07:44,219

and and we did a reenactment of two

200

00:07:48,320 --> 00:07:45,930

famous debates thallon hills me to write

201
00:07:50,209 --> 00:07:48,330
debate in the apex shirt debate which i

202
00:07:51,980 --> 00:07:50,219
think is really great because the one

203
00:07:53,959 --> 00:07:51,990
guy who is aunty on the one side was

204
00:07:56,659 --> 00:07:53,969
really on the defense on the other one

205
00:07:58,070 --> 00:07:56,669
in the exact same I mean he made the

206
00:08:00,589 --> 00:07:58,080
exact same mistake he was complaining

207
00:08:02,600 --> 00:08:00,599
about so that's really good uh-huh and

208
00:08:05,869 --> 00:08:02,610
then yeah Grady I mean this is boring I

209
00:08:08,719 --> 00:08:05,879
I had two papers and then an artistic

210
00:08:10,909 --> 00:08:08,729
timeline of earth kind of project where

211
00:08:13,700 --> 00:08:10,919
they had to show the geological time

212
00:08:15,829 --> 00:08:13,710
scale and then site and somehow

213
00:08:18,140 --> 00:08:15,839

artistically represent various time

214

00:08:20,510 --> 00:08:18,150

points of life's evolution it was kind

215

00:08:22,070 --> 00:08:20,520

of fun i also had weekly cuisine o's

216

00:08:24,140 --> 00:08:22,080

like small little quizzes that take like

217

00:08:25,909 --> 00:08:24,150

ten minutes over the reading so they had

218

00:08:27,350 --> 00:08:25,919

to come to class having read it like

219

00:08:29,300 --> 00:08:27,360

force them to come to class having read

220

00:08:31,010 --> 00:08:29,310

everything and then i had a final group

221

00:08:32,839 --> 00:08:31,020

presentation on a sci-fi book where they

222

00:08:35,329 --> 00:08:32,849

analyzed astrobiology and that little

223

00:08:38,269 --> 00:08:35,339

thing is online now is from TY robinson

224

00:08:41,180 --> 00:08:38,279

actually gave me that idea but it was

225

00:08:42,670 --> 00:08:41,190

really fun i must say so what happened

226

00:08:46,130 --> 00:08:42,680

basically the course went really well

227

00:08:49,250 --> 00:08:46,140

the course got 4.97 out of 5 from 19

228

00:08:52,220 --> 00:08:49,260

students as an average and almost all

229

00:08:52,970 --> 00:08:52,230

commented on little life nuggets of

230

00:08:54,769 --> 00:08:52,980

wisdom part

231

00:08:57,620 --> 00:08:54,779

I included which is about five percent

232

00:08:59,900 --> 00:08:57,630

of the total class time so I spent

233

00:09:01,790 --> 00:08:59,910

between 20 and 40 minutes and four

234

00:09:03,800 --> 00:09:01,800

separate and four lectures throughout

235

00:09:04,970 --> 00:09:03,810

the entire semester talking about this

236

00:09:06,769 --> 00:09:04,980

and this is what I talked about oh

237

00:09:09,139 --> 00:09:06,779

here's actually some quotes from reviews

238

00:09:10,519 --> 00:09:09,149

I don't know if I can even create a full

239

00:09:12,829 --> 00:09:10,529

list I feel like the class needs to be

240

00:09:16,189 --> 00:09:12,839

retitled life on earth beyond and little

241

00:09:17,990 --> 00:09:16,199

general life advice what stuck with me

242

00:09:20,720 --> 00:09:18,000

the most was looking at science at the

243

00:09:23,629 --> 00:09:20,730

process yay you know continually

244

00:09:25,550 --> 00:09:23,639

discovering and probing disposing and

245

00:09:27,199 --> 00:09:25,560

refining of ideas with all the

246

00:09:29,300 --> 00:09:27,209

complications of human error due to pair

247

00:09:30,680 --> 00:09:29,310

times and prejudices I learned so much

248

00:09:32,210 --> 00:09:30,690

from the class was about science and how

249

00:09:36,410 --> 00:09:32,220

to succeed confidence public speaking

250

00:09:37,970 --> 00:09:36,420

etc there are little lots of little

251
00:09:41,150 --> 00:09:37,980
nuggets I will remember and apply to my

252
00:09:44,720 --> 00:09:41,160
life such as power poses in the impostor

253
00:09:46,879 --> 00:09:44,730
syndrome and you know they also this

254
00:09:49,220 --> 00:09:46,889
won't mentioned one of my other points

255
00:09:50,750 --> 00:09:49,230
which was on females on science so the

256
00:09:53,150 --> 00:09:50,760
court the lecture I gave on science and

257
00:09:54,920 --> 00:09:53,160
feminism was the best always my class

258
00:09:57,470 --> 00:09:54,930
interesting after this of course again

259
00:09:59,840 --> 00:09:57,480
it's awesome so I felt like this was if

260
00:10:01,490 --> 00:09:59,850
I had to say what connected with

261
00:10:03,829 --> 00:10:01,500
students it was this five percent of the

262
00:10:06,949 --> 00:10:03,839
class you know and this is like way out

263
00:10:09,439 --> 00:10:06,959

of the scope of what most science

264

00:10:11,150 --> 00:10:09,449

college classes do it was kind of a

265

00:10:12,410 --> 00:10:11,160

little mini experiment for me and I was

266

00:10:14,840 --> 00:10:12,420

like these are things I care about I'm

267

00:10:16,519 --> 00:10:14,850

going to tie them in somehow to the port

268

00:10:19,309 --> 00:10:16,529

led the point in the course that we're

269

00:10:21,860 --> 00:10:19,319

at and it really resonated with all the

270

00:10:24,620 --> 00:10:21,870

students and like out of the 19 reviews

271

00:10:27,470 --> 00:10:24,630

I got almost I don't know like 16 to 18

272

00:10:29,750 --> 00:10:27,480

of them mentioned something like this so

273

00:10:32,090 --> 00:10:29,760

the person i get i did was paradigms and

274

00:10:33,290 --> 00:10:32,100

I tied this in with the debates when we

275

00:10:36,230 --> 00:10:33,300

were talking about the two debates how

276

00:10:37,850 --> 00:10:36,240

the one guy could clearly see the faults

277

00:10:39,710 --> 00:10:37,860

and the other research but then when it

278

00:10:42,949 --> 00:10:39,720

came to his own could not see the exact

279

00:10:46,309 --> 00:10:42,959

same problems which is just awesome and

280

00:10:49,040 --> 00:10:46,319

I had them share examples with how they

281

00:10:50,360 --> 00:10:49,050

themselves had paradigm blocks does

282

00:10:52,129 --> 00:10:50,370

everyone know what a paradigm is it's

283

00:10:54,590 --> 00:10:52,139

basically how comes back to this

284

00:10:57,800 --> 00:10:54,600

misconception idea your worldview and

285

00:11:01,220 --> 00:10:57,810

your what you think already influences

286

00:11:02,960 --> 00:11:01,230

what you can even perceive or or see

287

00:11:04,610 --> 00:11:02,970

you're just going to throw out data that

288

00:11:06,259 --> 00:11:04,620

disagrees with you and you're going to

289

00:11:06,800 --> 00:11:06,269

readily take and data that agrees with

290

00:11:08,180 --> 00:11:06,810

you

291

00:11:09,019 --> 00:11:08,190

and this happens to scientists happens

292

00:11:10,940 --> 00:11:09,029

to business people it happens

293

00:11:13,100 --> 00:11:10,950

politicians I mean happens everywhere in

294

00:11:17,470 --> 00:11:13,110

life and so we talked about this a lot

295

00:11:20,300 --> 00:11:17,480

in the class and then I have there's a

296

00:11:22,160 --> 00:11:20,310

so the videos are there's a video link

297

00:11:23,780 --> 00:11:22,170

at the end which has one of these

298

00:11:25,760 --> 00:11:23,790

paradigm videos that you can like go

299

00:11:27,470 --> 00:11:25,770

online to their their website and stream

300

00:11:28,940 --> 00:11:27,480

the whole thing but the video itself is

301

00:11:31,480 --> 00:11:28,950

really expensive so I didn't upload that

302

00:11:45,620 --> 00:11:31,490

but you can find it on interlibrary loan

303

00:11:47,180 --> 00:11:45,630

so so yeah right we read what we have we

304

00:11:49,790 --> 00:11:47,190

have a preconceived idea of how English

305

00:11:52,040 --> 00:11:49,800

and words work and we read them without

306

00:11:53,720 --> 00:11:52,050

actually reading them carefully this

307

00:11:55,519 --> 00:11:53,730

happens in scientific data all the time

308

00:11:58,730 --> 00:11:55,529

if you don't believe it just wait it'll

309

00:12:00,260 --> 00:11:58,740

happen to you but also you can see about

310

00:12:03,620 --> 00:12:00,270

it when you look at historical science

311

00:12:06,440 --> 00:12:03,630

examples this is you know the challah

312

00:12:09,560 --> 00:12:06,450

constant basically this was taken from a

313

00:12:11,570 --> 00:12:09,570

course I tf2 at Harvard from that

314

00:12:13,700 --> 00:12:11,580

Professor but he said always confident

315

00:12:16,670 --> 00:12:13,710

never correct and basically you know

316

00:12:18,470 --> 00:12:16,680

everyone went around like oh this is you

317

00:12:20,360 --> 00:12:18,480

know how about concert oh yeah so we'll

318

00:12:22,100 --> 00:12:20,370

get all values close to that oh no it's

319

00:12:24,500 --> 00:12:22,110

actually down here okay no it's actually

320

00:12:29,600 --> 00:12:24,510

down here oh yeah yeah it's all here and

321

00:12:31,970 --> 00:12:29,610

so we tend to find values for data that

322

00:12:33,829 --> 00:12:31,980

fit with data that's already been

323

00:12:35,150 --> 00:12:33,839

published you know even though maybe

324

00:12:37,100 --> 00:12:35,160

they could have had a better value

325

00:12:39,500 --> 00:12:37,110

earlier on and so this is again just

326

00:12:42,079 --> 00:12:39,510

like a paradigm idea similarly my

327

00:12:44,270 --> 00:12:42,089

advisor demitasse a slob when he first

328

00:12:46,520 --> 00:12:44,280

heard about the first exoplanet so this

329

00:12:48,020 --> 00:12:46,530

was a hot Jupiter a Jupiter that's very

330

00:12:49,820 --> 00:12:48,030

big planet or being very close to the

331

00:12:52,880 --> 00:12:49,830

star it had an orbit of four days

332

00:12:54,079 --> 00:12:52,890

previously in planetary formation models

333

00:12:55,699 --> 00:12:54,089

they thought you first had to be like

334

00:12:58,340 --> 00:12:55,709

way out in the outer solar system where

335

00:13:00,920 --> 00:12:58,350

there was ice and dust so at like ten a

336

00:13:04,519 --> 00:13:00,930

you so he saw this figure he talked to

337

00:13:07,070 --> 00:13:04,529

the michelle maher and michelle told him

338

00:13:09,050 --> 00:13:07,080

it's a four day orbit and my advisor

339

00:13:10,760 --> 00:13:09,060

could not here for days like it was

340

00:13:13,430 --> 00:13:10,770

impossible for him to take in four days

341

00:13:15,560 --> 00:13:13,440

because his idea of Jupiter's was that

342

00:13:17,970 --> 00:13:15,570

they're far out and so he heard 400 days

343

00:13:19,530 --> 00:13:17,980

and he was like 400 days 400

344

00:13:20,850 --> 00:13:19,540

and he talked to his wife that night

345

00:13:22,560 --> 00:13:20,860

he's like this is ridiculous this can't

346

00:13:23,850 --> 00:13:22,570

be true no plan no jupiter-sized planet

347

00:13:25,710 --> 00:13:23,860

could be at 400 days that's way too

348

00:13:27,510 --> 00:13:25,720

close that's near Earth's orbit it needs

349

00:13:29,460 --> 00:13:27,520

to be even further out and then imagine

350

00:13:31,320 --> 00:13:29,470

has surprised the next day when he was

351
00:13:33,570 --> 00:13:31,330
at the conference and it like was driven

352
00:13:35,370 --> 00:13:33,580
home no this planet's super closest star

353
00:13:37,140 --> 00:13:35,380
and he was just like how did I even miss

354
00:13:40,740 --> 00:13:37,150
that I talked to the talk to the guy for

355
00:13:42,030 --> 00:13:40,750
20 minutes so then the second thing I

356
00:13:44,730 --> 00:13:42,040
talked about was why everyone should

357
00:13:46,890 --> 00:13:44,740
become a feminist I have a whole bunch

358
00:13:48,510 --> 00:13:46,900
of women in science resources at this

359
00:13:51,030 --> 00:13:48,520
link which again you can just see on the

360
00:13:52,290 --> 00:13:51,040
on the slides when you get it and where

361
00:13:54,390 --> 00:13:52,300
I show like about a lot of the

362
00:13:56,490 --> 00:13:54,400
peer-reviewed studies so I'm interested

363
00:13:58,260 --> 00:13:56,500

in you know not necessarily just

364

00:14:00,630 --> 00:13:58,270

anecdotal stuff but what is the data and

365

00:14:03,180 --> 00:14:00,640

and you probably are familiar with this

366

00:14:06,720 --> 00:14:03,190

study but if you're not it's fascinating

367

00:14:08,910 --> 00:14:06,730

/ terrifying where they had the same

368

00:14:10,860 --> 00:14:08,920

resume but they just put different names

369

00:14:13,040 --> 00:14:10,870

John and Jennifer on it they sent it out

370

00:14:15,590 --> 00:14:13,050

to physics biology and chemistry

371

00:14:18,990 --> 00:14:15,600

professors and they had the professor's

372

00:14:22,470 --> 00:14:19,000

rank the resumes based on higher ability

373

00:14:24,810 --> 00:14:22,480

competence mentor ability and they give

374

00:14:26,610 --> 00:14:24,820

them the female a twelve percent lower

375

00:14:28,680 --> 00:14:26,620

starting salary and ranked her lower on

376

00:14:30,720 --> 00:14:28,690

everything else even though it's the

377

00:14:33,510 --> 00:14:30,730

exact same word for word resume and this

378

00:14:35,280 --> 00:14:33,520

is in 2012 with you know across the

379

00:14:37,410 --> 00:14:35,290

sciences across from public and private

380

00:14:39,900 --> 00:14:37,420

universities did not matter the age of

381

00:14:41,370 --> 00:14:39,910

the professor evaluating it didn't

382

00:14:43,650 --> 00:14:41,380

matter the tenure status didn't matter

383

00:14:45,210 --> 00:14:43,660

the gender of the professor evaluating

384

00:14:47,010 --> 00:14:45,220

it didn't matter we all have these

385

00:14:49,080 --> 00:14:47,020

biases and so there's a whole bunch of

386

00:14:51,710 --> 00:14:49,090

other resources which I have online but

387

00:14:54,210 --> 00:14:51,720

you know we talked a bit about that and

388

00:14:56,190 --> 00:14:54,220

specifically it's brought up in hazen's

389

00:14:58,830 --> 00:14:56,200

books so I tied that end win when we got

390

00:15:00,090 --> 00:14:58,840

to that part the second I don't know how

391

00:15:02,070 --> 00:15:00,100

I really tied this into the course I

392

00:15:04,770 --> 00:15:02,080

just think it's so important for young

393

00:15:07,620 --> 00:15:04,780

people to know is the power of compound

394

00:15:09,060 --> 00:15:07,630

interest IE open a roth IRA and I think

395

00:15:11,700 --> 00:15:09,070

I tied this into the funding of science

396

00:15:14,610 --> 00:15:11,710

somehow tangentially but you should all

397

00:15:17,010 --> 00:15:14,620

have a roth IRA if you don't because of

398

00:15:19,770 --> 00:15:17,020

this table particularly take a close

399

00:15:21,600 --> 00:15:19,780

look investor and investor be and see

400

00:15:24,210 --> 00:15:21,610

what the end result is based on when you

401
00:15:25,500 --> 00:15:24,220
invest money in a retirement account I'm

402
00:15:27,060 --> 00:15:25,510
not going to go over this this is

403
00:15:29,460 --> 00:15:27,070
something you can look at on the slides

404
00:15:31,260 --> 00:15:29,470
but that was something I tied into my

405
00:15:33,150 --> 00:15:31,270
lectures just as kind of like an FYI

406
00:15:34,770 --> 00:15:33,160
I you know if you're over 18 you're

407
00:15:37,070 --> 00:15:34,780
almost already too late so get going

408
00:15:38,940 --> 00:15:37,080
write it right as soon as possible and

409
00:15:42,000 --> 00:15:38,950
the last thing because they gave a

410
00:15:43,530 --> 00:15:42,010
public speaking presentation at the end

411
00:15:45,900 --> 00:15:43,540
I tied in public speaking in

412
00:15:47,760 --> 00:15:45,910
presentation skills and we watch this

413
00:15:50,190 --> 00:15:47,770

TED talk which if you haven't seen it

414

00:15:51,930 --> 00:15:50,200

it's fantastic to Amy Cuddy's TED talk

415

00:15:56,310 --> 00:15:51,940

and power poses how many of you have

416

00:16:00,450 --> 00:15:56,320

seen it yeah so like a third basically

417

00:16:02,610 --> 00:16:00,460

in a nutshell standing like this two

418

00:16:04,410 --> 00:16:02,620

minutes before you give a presentation

419

00:16:07,980 --> 00:16:04,420

like what I just did in the bathroom

420

00:16:09,990 --> 00:16:07,990

during the break before coming on will

421

00:16:12,110 --> 00:16:10,000

lower your cortisol and raise your

422

00:16:14,400 --> 00:16:12,120

testosterone which basically makes you

423

00:16:16,080 --> 00:16:14,410

come across as being more confident and

424

00:16:17,970 --> 00:16:16,090

and its really really fascinating

425

00:16:20,310 --> 00:16:17,980

research they show even people who have

426

00:16:22,110 --> 00:16:20,320

been blind from birth when they win at a

427

00:16:23,640 --> 00:16:22,120

physical competition raise their hands

428

00:16:25,980 --> 00:16:23,650

up in this position even if they've

429

00:16:28,380 --> 00:16:25,990

never seen it done before and it's like

430

00:16:30,690 --> 00:16:28,390

cross-cultural and this is basically

431

00:16:32,550 --> 00:16:30,700

just a simple way that you can influence

432

00:16:33,780 --> 00:16:32,560

your own body chemistry before a job

433

00:16:35,850 --> 00:16:33,790

interview they did this in double-blind

434

00:16:37,290 --> 00:16:35,860

job interview studies preferentially the

435

00:16:40,860 --> 00:16:37,300

people who did this power pose were

436

00:16:43,170 --> 00:16:40,870

chosen so very interesting and so we did

437

00:16:44,660 --> 00:16:43,180

that just general preparation for

438

00:16:47,100 --> 00:16:44,670

teaching if you're astronomers

439

00:16:48,930 --> 00:16:47,110

definitely or you know because it says

440

00:16:50,550 --> 00:16:48,940

mathema mathematicians anyone really can

441

00:16:52,290 --> 00:16:50,560

go to this but it's particularly

442

00:16:54,150 --> 00:16:52,300

designed for astronomers it's the CAE

443

00:16:56,910 --> 00:16:54,160

workshop that's two days before every

444

00:16:58,170 --> 00:16:56,920

double AS event I would definitely

445

00:16:59,520 --> 00:16:58,180

recommend taking a public speaking

446

00:17:02,490 --> 00:16:59,530

course I would watch some of the videos

447

00:17:03,810 --> 00:17:02,500

i uploaded i really like the the

448

00:17:05,760 --> 00:17:03,820

teaching company's origins of life

449

00:17:07,920 --> 00:17:05,770

lectures by hazen that's how I kind of

450

00:17:09,090 --> 00:17:07,930

just learned what about prebiotic

451
00:17:11,040 --> 00:17:09,100
chemistry because I don't know anything

452
00:17:12,690 --> 00:17:11,050
about prebiotic chemistry and so that

453
00:17:15,390 --> 00:17:12,700
was a really useful course for me and

454
00:17:16,890 --> 00:17:15,400
then I put the the link here for that a

455
00:17:18,930 --> 00:17:16,900
paradigm video that's really expensive

456
00:17:20,820 --> 00:17:18,940
but you can watch the whole thing for

457
00:17:22,230 --> 00:17:20,830
free online it's like old all these

458
00:17:24,630 --> 00:17:22,240
videos are older but they're also good

459
00:17:26,190 --> 00:17:24,640
so I recommend all those and then I put

460
00:17:37,119 --> 00:17:26,200
the link down here and like i said i'll

461
00:17:45,080 --> 00:17:42,649
questions yeah Sarah thank you that was

462
00:17:46,849 --> 00:17:45,090
fantastic the only thing I didn't catch

463
00:17:49,700 --> 00:17:46,859

is how you got involved in the first

464

00:17:51,019 --> 00:17:49,710

place in developing this course and like

465

00:17:52,759 --> 00:17:51,029

so since you did it tough but you're at

466

00:17:54,739 --> 00:17:52,769

Harvard how would that how could we do

467

00:17:57,619 --> 00:17:54,749

that same kind of thing teach those kind

468

00:18:00,440 --> 00:17:57,629

of courses yes so I think uh so the

469

00:18:03,109 --> 00:18:00,450

first point how you can I think

470

00:18:07,369 --> 00:18:03,119

universities love it to get like really

471

00:18:09,499 --> 00:18:07,379

low paid labor so so this course for

472

00:18:10,970 --> 00:18:09,509

example i get paid more being a teaching

473

00:18:13,099 --> 00:18:10,980

assistant at harvard than i did for

474

00:18:14,479 --> 00:18:13,109

getting this course you know i think i

475

00:18:16,070 --> 00:18:14,489

think that for the whole semester was

476
00:18:18,049 --> 00:18:16,080
three thousand dollars i put weight you

477
00:18:20,119 --> 00:18:18,059
know more effort than than three

478
00:18:21,590 --> 00:18:20,129
thousand dollars into it because it's

479
00:18:23,720 --> 00:18:21,600
like you're the course head but it was

480
00:18:25,849 --> 00:18:23,730
super impactful for me so i recommend

481
00:18:27,619 --> 00:18:25,859
doing it and i think so you can just ask

482
00:18:29,029 --> 00:18:27,629
your neighboring universities if kind of

483
00:18:31,779 --> 00:18:29,039
like you're an adjunct you know you just

484
00:18:34,999 --> 00:18:31,789
come in and teach this class you can

485
00:18:37,639 --> 00:18:35,009
submit a proposal i particularly did

486
00:18:39,529 --> 00:18:37,649
this through a program that Tufts has to

487
00:18:40,639 --> 00:18:39,539
so they have this program called the

488
00:18:44,239 --> 00:18:40,649

experimental college where they

489

00:18:47,149 --> 00:18:44,249

particularly invite professionals and

490

00:18:48,680 --> 00:18:47,159

people with experience in from around

491

00:18:51,200 --> 00:18:48,690

the community so there were judges

492

00:18:54,320 --> 00:18:51,210

talking about supreme court cases or you

493

00:18:56,389 --> 00:18:54,330

know other sorts of classes that were

494

00:18:58,609 --> 00:18:56,399

timely in and on topic so i applied

495

00:19:00,019 --> 00:18:58,619

through that program and was accepted in

496

00:19:02,239 --> 00:19:00,029

through that program and then my course

497

00:19:05,629 --> 00:19:02,249

was actually offered for credit at tufts

498

00:19:07,879 --> 00:19:05,639

under the for a natural sciences credit

499

00:19:10,729 --> 00:19:07,889

for their majors not all courses are but

500

00:19:12,799 --> 00:19:10,739

so i think you can i think basically

501
00:19:14,029 --> 00:19:12,809
then there was maybe some conflict of

502
00:19:15,889 --> 00:19:14,039
interest and being paid as a grad

503
00:19:18,200 --> 00:19:15,899
student but i'm also giving some of my

504
00:19:20,989 --> 00:19:18,210
time to test so one of my professors

505
00:19:23,690 --> 00:19:20,999
mentioned that but no one else cared I

506
00:19:25,070 --> 00:19:23,700
guess so so in the end it didn't matter

507
00:19:27,859 --> 00:19:25,080
and I just didn't say anything to anyone

508
00:19:32,060 --> 00:19:27,869
about it but I think you can I think you

509
00:19:34,340 --> 00:19:32,070
can probably most colleges don't have an

510
00:19:36,440 --> 00:19:34,350
astrobiology origins of life class so I

511
00:19:39,229 --> 00:19:36,450
think they'd be happy to offer it and

512
00:19:40,639 --> 00:19:39,239
you can and what I love about teaching

513
00:19:41,989 --> 00:19:40,649

your own courses you're not under a

514

00:19:43,440 --> 00:19:41,999

professor you're not teaching physics

515

00:19:46,320 --> 00:19:43,450

101 where you really have to hit

516

00:19:47,909 --> 00:19:46,330

like all these different things you can

517

00:19:50,100 --> 00:19:47,919

teach whatever you want which is why I

518

00:19:58,019 --> 00:19:50,110

was able to put in five percent on other