
HUBBLE
hangouts
Disk Detective: Finding the Birthplace of Planets

1
00:00:04,789 --> 00:00:02,629
hello everybody and welcome to our

2
00:00:06,550 --> 00:00:04,799
latest hubble hangout my name is tony

3
00:00:08,390 --> 00:00:06,560
darnell i am the

4
00:00:10,310 --> 00:00:08,400
social media manager the space telescope

5
00:00:13,110 --> 00:00:10,320
science institute and today we have a

6
00:00:14,789 --> 00:00:13,120
really uh a really cool topic uh to

7
00:00:16,710 --> 00:00:14,799
discuss with you

8
00:00:18,310 --> 00:00:16,720
on finding another citizen science

9
00:00:20,630 --> 00:00:18,320
initiative called this detective which

10
00:00:22,790 --> 00:00:20,640
we're going to talk about and was just

11
00:00:24,630 --> 00:00:22,800
launched today right john

12
00:00:25,830 --> 00:00:24,640
that's correct today

13
00:00:28,390 --> 00:00:25,840

okay so

14
00:00:29,910 --> 00:00:28,400
uh with me with me is uh uh you guys

15
00:00:31,990 --> 00:00:29,920
remember him dr ian o'neill from

16
00:00:33,830 --> 00:00:32,000
discovery news hi ian thank you for

17
00:00:35,190 --> 00:00:33,840
joining me and he's going to help me

18
00:00:37,110 --> 00:00:35,200
with the discussion today and and

19
00:00:39,430 --> 00:00:37,120
finding out more space telescope science

20
00:00:41,190 --> 00:00:39,440
institute and we are going to be talking

21
00:00:43,510 --> 00:00:41,200
about a new citizen science initiative

22
00:00:46,069 --> 00:00:43,520
called dis detective and with me today

23
00:00:48,790 --> 00:00:46,079
is uh the the pis and the people

24
00:00:51,750 --> 00:00:48,800
involved uh let me start from my right

25
00:00:54,790 --> 00:00:51,760
and going to left uh dr mark

26
00:00:58,549 --> 00:00:54,800
kushner from uh nasa goddard hi mark hi

27
00:01:00,389 --> 00:00:58,559
tony hi he is you're the pi right yeah

28
00:01:01,990 --> 00:01:00,399
okay great so he'll he'll be talking a

29
00:01:03,990 --> 00:01:02,000
lot about uh

30
00:01:06,550 --> 00:01:04,000
uh the uh uh the project itself and

31
00:01:09,030 --> 00:01:06,560
where it was where it uh originated from

32
00:01:10,390 --> 00:01:09,040
also with me is dr john devis from space

33
00:01:11,910 --> 00:01:10,400
telescope science institute he's in

34
00:01:15,109 --> 00:01:11,920
astronomy here hi john it's good to see

35
00:01:18,710 --> 00:01:17,350
it's uh we did we did a another hangout

36
00:01:21,350 --> 00:01:18,720
a while back that i thought was really

37
00:01:24,390 --> 00:01:21,360
awesome also on uh on exoplanets and and

38
00:01:25,990 --> 00:01:24,400

planetary disks so welcome back uh and

39
00:01:29,190 --> 00:01:26,000
laura white dr laura white from the

40
00:01:31,670 --> 00:01:29,200
zuniverse and adler planetarium uh she

41
00:01:33,350 --> 00:01:31,680
is involved with the uh project from the

42
00:01:35,109 --> 00:01:33,360
zuniverse perspective so welcome back

43
00:01:37,670 --> 00:01:35,119
laura it's good to see you again thanks

44
00:01:40,469 --> 00:01:37,680
tony okay so let's go ahead and get

45
00:01:41,910 --> 00:01:40,479
started so um protoplanetary disks

46
00:01:47,030 --> 00:01:41,920
that's the

47
00:01:49,510 --> 00:01:47,040
working on here um

48
00:01:51,350 --> 00:01:49,520
john and and mark you guys are you guys

49
00:01:53,429 --> 00:01:51,360
are heavily into to this why don't you

50
00:01:55,270 --> 00:01:53,439
describe a little bit about what this

51
00:01:58,550 --> 00:01:55,280
research involves what what are you guys

52
00:02:03,830 --> 00:02:00,149
let's start all day long you check our

53
00:02:06,950 --> 00:02:05,270
well you're not checking email and

54
00:02:08,469 --> 00:02:06,960
turning off windows that that are

55
00:02:12,470 --> 00:02:08,479
feeding back youtube videos what else

56
00:02:14,470 --> 00:02:13,350
hello

57
00:02:16,150 --> 00:02:14,480
well uh

58
00:02:18,070 --> 00:02:16,160
i guess i'll start yeah go ahead that's

59
00:02:20,229 --> 00:02:18,080
what yeah um

60
00:02:22,790 --> 00:02:20,239
i study discs and

61
00:02:25,430 --> 00:02:22,800
the planets that live in them

62
00:02:27,830 --> 00:02:25,440
and uh i try to understand how planets

63
00:02:30,550 --> 00:02:27,840

form where planets form

64
00:02:31,430 --> 00:02:30,560
why planets form

65
00:02:33,270 --> 00:02:31,440
and

66
00:02:35,030 --> 00:02:33,280
whether there are any planets out there

67
00:02:36,470 --> 00:02:35,040
that can support life

68
00:02:38,309 --> 00:02:36,480
and how far how long have you been doing

69
00:02:39,990 --> 00:02:38,319
this how how uh

70
00:02:42,070 --> 00:02:40,000
this sounds to me like an area of

71
00:02:43,990 --> 00:02:42,080
research that's pretty new

72
00:02:45,509 --> 00:02:44,000
is this so am i right or is it something

73
00:02:47,190 --> 00:02:45,519
that's been going on for quite a while

74
00:02:49,270 --> 00:02:47,200
it is the very first planets were

75
00:02:51,830 --> 00:02:49,280
discovered in the 90s

76
00:02:54,470 --> 00:02:51,840
and

77
00:02:56,229 --> 00:02:54,480
you know those discoveries just being on

78
00:02:58,070 --> 00:02:56,239
its head

79
00:03:00,150 --> 00:02:58,080
but it's it's uh it's been really

80
00:03:01,750 --> 00:03:00,160
exciting to be part of this growing

81
00:03:04,149 --> 00:03:01,760
field

82
00:03:05,589 --> 00:03:04,159
and uh and and john you this is also

83
00:03:07,270 --> 00:03:05,599
this is not the only thing you study

84
00:03:08,949 --> 00:03:07,280
right you also do other things as well

85
00:03:10,869 --> 00:03:08,959
if i'm not mistaken but this is one of

86
00:03:13,670 --> 00:03:10,879
your main areas of research correct oh

87
00:03:15,509 --> 00:03:13,680
yeah yeah so i really like looking at

88
00:03:17,270 --> 00:03:15,519

dust around different things so i think

89
00:03:19,990 --> 00:03:17,280
the last time we talked about dust

90
00:03:23,509 --> 00:03:20,000
around dead stars and this is more dust

91
00:03:25,509 --> 00:03:23,519
around baby stars and

92
00:03:27,670 --> 00:03:25,519
here at the institute it's a really

93
00:03:29,990 --> 00:03:27,680
great place to work on

94
00:03:31,589 --> 00:03:30,000
looking at debris disks so you were

95
00:03:33,350 --> 00:03:31,599
talking about protoplanetary disks and

96
00:03:35,430 --> 00:03:33,360
that's where planets

97
00:03:37,589 --> 00:03:35,440
start forming and then after all the

98
00:03:40,710 --> 00:03:37,599
giant planets have formed we often see

99
00:03:43,350 --> 00:03:40,720
these big dusty disks uh that have sort

100
00:03:45,350 --> 00:03:43,360
of lived on beyond giant planet

101
00:03:47,430 --> 00:03:45,360
formation they don't have a lot of gas

102
00:03:49,589 --> 00:03:47,440
but they have tons of dust and they tend

103
00:03:51,750 --> 00:03:49,599
to have pretty interesting shapes and

104
00:03:53,990 --> 00:03:51,760
structures in them so mark also does a

105
00:03:55,990 --> 00:03:54,000
lot of work with these kinds of discs

106
00:03:57,190 --> 00:03:56,000
too so i like taking pictures of them

107
00:04:00,070 --> 00:03:57,200
and seeing

108
00:04:02,149 --> 00:04:00,080
in sort of very fine detail what these

109
00:04:03,910 --> 00:04:02,159
uh discs look like

110
00:04:05,750 --> 00:04:03,920
so i so there's a distinction then

111
00:04:07,429 --> 00:04:05,760
between i said proto planetary this that

112
00:04:08,949 --> 00:04:07,439
is a stage that's a little bit earlier

113
00:04:10,869 --> 00:04:08,959

than what we're discussing here then

114
00:04:12,470 --> 00:04:10,879
this is right three discs which are a

115
00:04:14,710 --> 00:04:12,480
little bit after the major planets that

116
00:04:16,469 --> 00:04:14,720
formed and what's left behind

117
00:04:18,949 --> 00:04:16,479
well the nice thing about this project

118
00:04:21,430 --> 00:04:18,959
is we'll see both the really young ones

119
00:04:24,230 --> 00:04:21,440
and the older ones too

120
00:04:27,189 --> 00:04:24,240
okay all right great so is there any

121
00:04:28,870 --> 00:04:27,199
sort of uh preference to

122
00:04:30,710 --> 00:04:28,880
how you begin looking for these kinds of

123
00:04:32,070 --> 00:04:30,720
things like if i have a telescope let's

124
00:04:33,350 --> 00:04:32,080
say the hubble space telescope or you

125
00:04:34,790 --> 00:04:33,360
just got through talking about going to

126
00:04:36,070 --> 00:04:34,800
keck uh

127
00:04:39,110 --> 00:04:36,080
where do you look for these things what

128
00:04:42,390 --> 00:04:39,120
are how do you even start

129
00:04:44,550 --> 00:04:42,400
uh let's go with you john oh okay so

130
00:04:47,030 --> 00:04:44,560
i i'm sure mark was going about about to

131
00:04:49,110 --> 00:04:47,040
say the same thing but actually uh back

132
00:04:51,430 --> 00:04:49,120
in the mid 80s there was the

133
00:04:53,990 --> 00:04:51,440
satellite called iras which was an

134
00:04:56,150 --> 00:04:54,000
all-sky infrared survey and that was

135
00:04:59,430 --> 00:04:56,160
really one of the first ways that people

136
00:05:01,830 --> 00:04:59,440
found evidence for these kinds of discs

137
00:05:04,230 --> 00:05:01,840
at least like debris discs because they

138
00:05:06,710 --> 00:05:04,240

saw that some stars that looked pretty

139
00:05:08,070 --> 00:05:06,720
normal at shorter wavelengths were way

140
00:05:10,469 --> 00:05:08,080
much brighter

141
00:05:12,790 --> 00:05:10,479
in the mid infrared wavelengths and they

142
00:05:14,870 --> 00:05:12,800
attributed this to dust and when people

143
00:05:16,150 --> 00:05:14,880
started looking at these stars

144
00:05:18,230 --> 00:05:16,160
with uh

145
00:05:20,070 --> 00:05:18,240
the hubble space telescope and with

146
00:05:22,790 --> 00:05:20,080
other other telescopes they started

147
00:05:24,150 --> 00:05:22,800
seeing that these excesses were due to

148
00:05:26,629 --> 00:05:24,160
dust discs that you could actually

149
00:05:28,550 --> 00:05:26,639
resolve out so the first thing you want

150
00:05:30,550 --> 00:05:28,560
to do is you want to look for discs that

151
00:05:32,790 --> 00:05:30,560
are too bright in the infrared

152
00:05:35,189 --> 00:05:32,800
wavelengths of light

153
00:05:36,870 --> 00:05:35,199
okay so that's that's that's a pretty

154
00:05:38,469 --> 00:05:36,880
important point then because this

155
00:05:40,870 --> 00:05:38,479
without infrared

156
00:05:42,390 --> 00:05:40,880
uh telescopes then this this research

157
00:05:43,590 --> 00:05:42,400
probably wouldn't be possible either and

158
00:05:46,550 --> 00:05:43,600
that's another reason why this is a

159
00:05:48,950 --> 00:05:46,560
pretty new uh field of study because the

160
00:05:50,550 --> 00:05:48,960
infrared detectors are the one the kind

161
00:05:52,230 --> 00:05:50,560
of detectors that have enough resolution

162
00:05:54,310 --> 00:05:52,240
that might be able to resolve some of

163
00:05:56,710 --> 00:05:54,320

these disks are relatively new as well i

164
00:05:58,230 --> 00:05:56,720
mean that they've been coming on well

165
00:06:00,230 --> 00:05:58,240
they've been making big strides since

166
00:06:01,749 --> 00:06:00,240
the 90s but uh

167
00:06:05,189 --> 00:06:01,759
i think they came into their own in like

168
00:06:07,029 --> 00:06:05,199
early 2000 mid 2005 infrared detectors

169
00:06:08,710 --> 00:06:07,039
of all different kinds became able to

170
00:06:10,230 --> 00:06:08,720
resolve these things so they're pretty

171
00:06:12,629 --> 00:06:10,240
that's another reason why i think this

172
00:06:14,629 --> 00:06:12,639
science is only just now getting started

173
00:06:15,350 --> 00:06:14,639
uh is that right

174
00:06:22,230 --> 00:06:15,360
yeah

175
00:06:23,350 --> 00:06:22,240
bit of uh voodoo

176
00:06:24,950 --> 00:06:23,360
i know

177
00:06:26,710 --> 00:06:24,960
yeah

178
00:06:29,350 --> 00:06:26,720
i mean there's some of them that uh

179
00:06:31,189 --> 00:06:29,360
where in order to tune the band pass you

180
00:06:33,029 --> 00:06:31,199
have to uh

181
00:06:34,710 --> 00:06:33,039
more or less literally put them inside a

182
00:06:37,110 --> 00:06:34,720
a a

183
00:06:38,469 --> 00:06:37,120
plant a vice and just kind of squish

184
00:06:40,230 --> 00:06:38,479
them until they give you the right

185
00:06:42,790 --> 00:06:40,240
properties

186
00:06:44,550 --> 00:06:42,800
yeah and the uh and they were at least

187
00:06:46,469 --> 00:06:44,560
when i was working with uh the ones that

188
00:06:48,230 --> 00:06:46,479

i did at the uh the high altitude

189
00:06:50,230 --> 00:06:48,240
observatory they were um they were

190
00:06:51,430 --> 00:06:50,240
pretty they were pretty the failure rate

191
00:06:52,710 --> 00:06:51,440
of making them was pretty high and it

192
00:06:55,830 --> 00:06:52,720
was it was difficult thing to do but

193
00:06:57,350 --> 00:06:55,840
anyway uh the detectors are now uh it's

194
00:06:58,870 --> 00:06:57,360
sort of mature enough that these these

195
00:07:01,990 --> 00:06:58,880
kinds of things can get done pretty well

196
00:07:04,150 --> 00:07:02,000
so um so do you guys use the hubble

197
00:07:05,830 --> 00:07:04,160
space telescope very much for this or is

198
00:07:08,309 --> 00:07:05,840
it pri what what are the primary

199
00:07:11,589 --> 00:07:08,319
instruments for looking at these uh

200
00:07:15,189 --> 00:07:13,350
oh yeah sure so

201
00:07:17,990 --> 00:07:15,199
uh like i said iras was sort of the

202
00:07:19,670 --> 00:07:18,000
first telescope to to really start where

203
00:07:22,230 --> 00:07:19,680
you were starting to look for them and

204
00:07:25,909 --> 00:07:22,240
find them in large numbers

205
00:07:27,830 --> 00:07:25,919
and then with spitzer being launched

206
00:07:29,909 --> 00:07:27,840
sort of in the early 2000s that was

207
00:07:31,110 --> 00:07:29,919
another really great telescope for

208
00:07:33,510 --> 00:07:31,120
finding

209
00:07:35,830 --> 00:07:33,520
these discs unresolved you couldn't you

210
00:07:38,390 --> 00:07:35,840
couldn't see the disc properties at all

211
00:07:41,110 --> 00:07:38,400
you just knew that they had extra mid in

212
00:07:43,350 --> 00:07:41,120
for infrared light and then

213
00:07:46,469 --> 00:07:43,360

the next upgrade is really is sort of

214
00:07:49,990 --> 00:07:46,479
wise because that was uh an all-sky

215
00:07:52,950 --> 00:07:50,000
survey just like iras was but it was up

216
00:07:56,710 --> 00:07:52,960
10 to 100 times more sensitive than than

217
00:07:59,350 --> 00:07:56,720
iras was so hope that that's bringing in

218
00:08:00,469 --> 00:07:59,360
you know millions of sources new sources

219
00:08:02,710 --> 00:08:00,479
to look at

220
00:08:04,869 --> 00:08:02,720
but then the idea is once you find that

221
00:08:07,189 --> 00:08:04,879
these objects seem to have discs around

222
00:08:08,230 --> 00:08:07,199
them you can follow them up

223
00:08:10,150 --> 00:08:08,240
with

224
00:08:11,830 --> 00:08:10,160
high contrast imaging try to actually

225
00:08:14,629 --> 00:08:11,840
see the discs themselves and that you

226
00:08:17,110 --> 00:08:14,639
can do either with hubble or with some

227
00:08:19,029 --> 00:08:17,120
of the most advanced adoptive optics

228
00:08:21,749 --> 00:08:19,039
systems from the ground and those are

229
00:08:22,950 --> 00:08:21,759
really your two options right now

230
00:08:24,629 --> 00:08:22,960
but hopefully

231
00:08:26,390 --> 00:08:24,639
in a few years we'll also have the james

232
00:08:29,029 --> 00:08:26,400
webb space telescope which hopefully

233
00:08:31,430 --> 00:08:29,039
will also really clean up on resolving a

234
00:08:32,709 --> 00:08:31,440
lot of these discs and uh

235
00:08:34,709 --> 00:08:32,719
turning them into lots of pretty

236
00:08:35,829 --> 00:08:34,719
pictures that's true there's a lot of

237
00:08:39,269 --> 00:08:35,839
things that i think we're looking

238
00:08:40,870 --> 00:08:39,279

forward to from uh from jwst but the uh

239
00:08:42,230 --> 00:08:40,880
the the couple couple of things i wanted

240
00:08:44,470 --> 00:08:42,240
to point out while john was talking is

241
00:08:46,550 --> 00:08:44,480
we should talk a little bit about um

242
00:08:48,389 --> 00:08:46,560
what adaptive optics is adaptive optics

243
00:08:49,990 --> 00:08:48,399
is a thing that many ground-based

244
00:08:52,710 --> 00:08:50,000
observatories have

245
00:08:53,670 --> 00:08:52,720
to uh sort of compensate for the fact

246
00:08:55,750 --> 00:08:53,680
that they're underneath the earth's

247
00:08:58,150 --> 00:08:55,760
atmosphere they are these electronic

248
00:09:00,310 --> 00:08:58,160
systems that will uh generally shoot out

249
00:09:02,790 --> 00:09:00,320
an artificial light source like a laser

250
00:09:04,630 --> 00:09:02,800
or a guide to make an artificial star

251
00:09:06,470 --> 00:09:04,640
and then try to and then look at the

252
00:09:08,550 --> 00:09:06,480
light from that and then very fast that

253
00:09:10,949 --> 00:09:08,560
will correct and cancel out the the

254
00:09:13,110 --> 00:09:10,959
effects of the atmosphere and using all

255
00:09:15,190 --> 00:09:13,120
kinds of mirrors and little flexible uh

256
00:09:15,910 --> 00:09:15,200
servos and things like that

257
00:09:18,310 --> 00:09:15,920
to

258
00:09:19,350 --> 00:09:18,320
get the effects of the atmosphere out

259
00:09:21,590 --> 00:09:19,360
because

260
00:09:23,670 --> 00:09:21,600
it severely restricts what you can

261
00:09:25,509 --> 00:09:23,680
actually resolve on the ground with the

262
00:09:27,829 --> 00:09:25,519
atmosphere does when it's uh you know

263
00:09:29,509 --> 00:09:27,839

boiling and light is trying to travel

264
00:09:31,350 --> 00:09:29,519
through all of these cells of different

265
00:09:33,670 --> 00:09:31,360
densities and things like that and when

266
00:09:36,389 --> 00:09:33,680
we say resolved that means that we can

267
00:09:38,070 --> 00:09:36,399
actually pick out detail from it the

268
00:09:40,070 --> 00:09:38,080
if you just see a blob

269
00:09:41,990 --> 00:09:40,080
uh then you you know that's not a

270
00:09:44,310 --> 00:09:42,000
resolved object unless if there's more

271
00:09:45,910 --> 00:09:44,320
detail in there you want either a larger

272
00:09:48,150 --> 00:09:45,920
instrument or a larger

273
00:09:50,949 --> 00:09:48,160
mirror something like that to uh to give

274
00:09:52,949 --> 00:09:50,959
you better detail and and uh that's what

275
00:09:54,150 --> 00:09:52,959
that's what we mean by by resolving

276
00:09:56,310 --> 00:09:54,160
these things so

277
00:09:58,150 --> 00:09:56,320
um the is there any let me ask you guys

278
00:10:00,630 --> 00:09:58,160
and and maybe mark that you can speak to

279
00:10:01,990 --> 00:10:00,640
this the uh is there any sense of the

280
00:10:03,670 --> 00:10:02,000
the

281
00:10:05,590 --> 00:10:03,680
statistics well first of all you're

282
00:10:07,350 --> 00:10:05,600
looking in our galaxy right or are you

283
00:10:09,910 --> 00:10:07,360
looking in other galaxies

284
00:10:13,190 --> 00:10:09,920
we're looking all over the sky

285
00:10:16,230 --> 00:10:13,200
and the odds are best that we'll end up

286
00:10:19,110 --> 00:10:16,240
seeing things in our galaxy but uh

287
00:10:21,990 --> 00:10:19,120
you know there's there's no special uh

288
00:10:24,230 --> 00:10:22,000

filter we have that that uh prevents us

289
00:10:25,910 --> 00:10:24,240
from looking beyond our galaxy

290
00:10:26,870 --> 00:10:25,920
well it would be limited by resolving

291
00:10:29,590 --> 00:10:26,880
them right i mean you could actually

292
00:10:31,030 --> 00:10:29,600
resolve disks in other galaxies

293
00:10:33,590 --> 00:10:31,040
no none of the disks that we're

294
00:10:35,750 --> 00:10:33,600
searching for with disk detective are

295
00:10:37,269 --> 00:10:35,760
resolved okay

296
00:10:39,750 --> 00:10:37,279
so okay we'll get to that in just a

297
00:10:41,829 --> 00:10:39,760
minute but are they in our galaxy

298
00:10:44,710 --> 00:10:41,839
the ones that we're searching for are in

299
00:10:46,710 --> 00:10:44,720
our galaxy okay okay good and so that

300
00:10:50,630 --> 00:10:46,720
leads to my question are there any

301
00:10:53,110 --> 00:10:50,640
statistics that sort of point to

302
00:10:55,829 --> 00:10:53,120
how many stars do you expect in our

303
00:10:58,389 --> 00:10:55,839
galaxy to have these kind of debris

304
00:10:59,750 --> 00:10:58,399
disks around them uh you know

305
00:11:01,269 --> 00:10:59,760
roughly speaking is there any sense of

306
00:11:03,190 --> 00:11:01,279
that or is it too early is that what

307
00:11:04,630 --> 00:11:03,200
you're trying to find out with this that

308
00:11:07,430 --> 00:11:04,640
is one of the things we're trying to

309
00:11:11,350 --> 00:11:07,440
learn okay but we have some ideas from

310
00:11:13,430 --> 00:11:11,360
previous searches like the irs survey

311
00:11:15,110 --> 00:11:13,440
that john introduced

312
00:11:18,310 --> 00:11:15,120
and that taught us that something like

313
00:11:20,470 --> 00:11:18,320

five percent of stars that are

314
00:11:22,949 --> 00:11:20,480
similar to the sun

315
00:11:24,150 --> 00:11:22,959
have the deepest so maybe one out of

316
00:11:27,430 --> 00:11:24,160
twenty

317
00:11:30,790 --> 00:11:27,440
oh okay all right well i

318
00:11:32,870 --> 00:11:30,800
furiously um closed all of my windows at

319
00:11:34,630 --> 00:11:32,880
the beginning of this thing so um i'd

320
00:11:37,350 --> 00:11:34,640
like to talk a little bit now about the

321
00:11:39,269 --> 00:11:37,360
this detective itself you uh who first

322
00:11:41,990 --> 00:11:39,279
of all whose idea was it who came up

323
00:11:43,910 --> 00:11:42,000
with the idea

324
00:11:45,670 --> 00:11:43,920
well the idea goes back

325
00:11:50,230 --> 00:11:45,680
we really have to start by thanking the

326
00:11:55,750 --> 00:11:53,350
ned wright and and uh

327
00:12:00,550 --> 00:11:55,760
and those folks for for for flying such

328
00:12:04,630 --> 00:12:02,389
that was that got repurposed didn't it

329
00:12:07,750 --> 00:12:04,640
the wise was launched to do one thing

330
00:12:09,350 --> 00:12:07,760
and now it got re it was woken up again

331
00:12:12,069 --> 00:12:09,360
am i remembering right

332
00:12:13,910 --> 00:12:12,079
that's right um wise completed its

333
00:12:16,949 --> 00:12:13,920
original mission and was repurposed as

334
00:12:19,990 --> 00:12:16,959
neo-wise to study asteroids what's so

335
00:12:21,829 --> 00:12:20,000
great is that this mission can do

336
00:12:24,150 --> 00:12:21,839
all kinds of different science it

337
00:12:25,829 --> 00:12:24,160
doesn't just observe discs it's good at

338
00:12:27,590 --> 00:12:25,839

finding ground doors

339
00:12:30,389 --> 00:12:27,600
studying asteroids

340
00:12:32,550 --> 00:12:30,399
studying planetary nebulite and galaxies

341
00:12:34,230 --> 00:12:32,560
and all kinds of stuff like that it just

342
00:12:36,629 --> 00:12:34,240
so happens that

343
00:12:38,310 --> 00:12:36,639
don and i when we were starting to work

344
00:12:40,069 --> 00:12:38,320
on this project together this detected

345
00:12:42,310 --> 00:12:40,079
well we love disks

346
00:12:44,470 --> 00:12:42,320
so so we built something that would help

347
00:12:45,509 --> 00:12:44,480
us find more of the disks disks that we

348
00:12:47,590 --> 00:12:45,519
like

349
00:12:50,470 --> 00:12:47,600
okay so correct me if i'm wrong y stands

350
00:12:52,069 --> 00:12:50,480
for wide field infrared survey explorer

351
00:12:54,069 --> 00:12:52,079
right

352
00:12:56,389 --> 00:12:54,079
okay so and like you said it's a wide

353
00:12:58,310 --> 00:12:56,399
field telescope it looks in the infrared

354
00:13:00,069 --> 00:12:58,320
you can see a lot of the sky at one time

355
00:13:01,990 --> 00:13:00,079
and apparently you can take many many

356
00:13:05,430 --> 00:13:02,000
images and get and get kind of deep with

357
00:13:07,590 --> 00:13:05,440
it and so it have it had done its thing

358
00:13:09,110 --> 00:13:07,600
and then they turned it off and then you

359
00:13:10,470 --> 00:13:09,120
guys decided

360
00:13:11,509 --> 00:13:10,480
someone decided hey there's a lot of

361
00:13:13,910 --> 00:13:11,519
good science that we can do with this

362
00:13:15,269 --> 00:13:13,920
let's turn it back on and neowise was

363
00:13:18,069 --> 00:13:15,279

born so

364
00:13:19,910 --> 00:13:18,079
uh yeah so this this initiative this uh

365
00:13:21,750 --> 00:13:19,920
dis detective initiative wouldn't be

366
00:13:23,509 --> 00:13:21,760
possible without without wise so that's

367
00:13:25,350 --> 00:13:23,519
the data set you're using that correct a

368
00:13:26,150 --> 00:13:25,360
great instrument likewise

369
00:13:28,710 --> 00:13:26,160
yeah

370
00:13:30,949 --> 00:13:28,720
why is detected

371
00:13:33,190 --> 00:13:30,959
three-quarters of a billion

372
00:13:35,990 --> 00:13:33,200
sources

373
00:13:37,990 --> 00:13:36,000
what do you mean

374
00:13:41,990 --> 00:13:38,000
bright dots of some kind whether they're

375
00:13:45,110 --> 00:13:42,000
galaxies or bright infrared dots

376
00:13:46,310 --> 00:13:45,120
ground doors so who knows what light

377
00:13:47,190 --> 00:13:46,320
yeah

378
00:13:51,509 --> 00:13:47,200
okay

379
00:13:53,030 --> 00:13:51,519
ian go ahead you got a couple questions

380
00:13:54,949 --> 00:13:53,040
go ahead yeah i was gonna say do you

381
00:13:56,870 --> 00:13:54,959
want to find that video because i can

382
00:13:59,269 --> 00:13:56,880
probably step in for a little bit here

383
00:14:02,629 --> 00:13:59,279
but i've just had a few i just had a few

384
00:14:04,710 --> 00:14:02,639
questions already because um i met john

385
00:14:06,069 --> 00:14:04,720
when did i meet you first in person i

386
00:14:07,269 --> 00:14:06,079
mean it's strange to say meet somebody

387
00:14:09,590 --> 00:14:07,279
in person when you're always speaking

388
00:14:12,230 --> 00:14:09,600

online but we did actually physically me

389
00:14:14,069 --> 00:14:12,240
oh it was in l.a wasn't it yeah it was a

390
00:14:16,470 --> 00:14:14,079
double ass meeting an american

391
00:14:19,509 --> 00:14:16,480
astronomical society meeting maybe like

392
00:14:21,430 --> 00:14:19,519
five or six years ago 2008 yeah europe

393
00:14:23,110 --> 00:14:21,440
was 2008. there was a lot of

394
00:14:24,710 --> 00:14:23,120
conferences around there but one thing i

395
00:14:26,550 --> 00:14:24,720
found fascinating about your works

396
00:14:28,870 --> 00:14:26,560
physique back then was that you were

397
00:14:31,110 --> 00:14:28,880
looking at white dwarf stars i mean that

398
00:14:32,470 --> 00:14:31,120
was that was your thing and the thing

399
00:14:33,750 --> 00:14:32,480
that blew me awake at this time i was a

400
00:14:37,269 --> 00:14:33,760
vlogger i was blogging for universe

401
00:14:40,150 --> 00:14:37,279
today um i found it fascinating that you

402
00:14:41,829 --> 00:14:40,160
were analyzing white dwarfs and saying

403
00:14:43,670 --> 00:14:41,839
okay this white dwarf has got a debris

404
00:14:45,269 --> 00:14:43,680
disc around it and its atmosphere has

405
00:14:47,350 --> 00:14:45,279
been polluted by

406
00:14:48,870 --> 00:14:47,360
um i think it was heavier metals that

407
00:14:51,030 --> 00:14:48,880
suggested that there was something of

408
00:14:53,350 --> 00:14:51,040
some some form of planetary body or

409
00:14:56,230 --> 00:14:53,360
asteroids in orbit and you were saying

410
00:14:58,629 --> 00:14:56,240
this is the future of our solar system

411
00:15:00,710 --> 00:14:58,639
because ultimately our star the sun is

412
00:15:02,710 --> 00:15:00,720
gonna is gonna die and it's gonna turn

413
00:15:04,870 --> 00:15:02,720

into a white dwarf so actually what

414
00:15:07,509 --> 00:15:04,880
we're looking at is the far future of

415
00:15:10,150 --> 00:15:07,519
our sun and i find that fascinating so

416
00:15:12,629 --> 00:15:10,160
how does that i mean obviously this

417
00:15:13,509 --> 00:15:12,639
carries over into this new project

418
00:15:16,710 --> 00:15:13,519
how

419
00:15:19,110 --> 00:15:16,720
find that are perhaps

420
00:15:21,670 --> 00:15:19,120
future versions of our solar system

421
00:15:22,470 --> 00:15:21,680
perhaps these you know doomsday versions

422
00:15:24,230 --> 00:15:22,480
of

423
00:15:27,110 --> 00:15:24,240
what happens to our sun

424
00:15:30,069 --> 00:15:27,120
actually well so in that's how i got

425
00:15:31,829 --> 00:15:30,079
into wise is using wise to look for

426
00:15:33,910 --> 00:15:31,839
these dusty white dwarfs but i actually

427
00:15:35,990 --> 00:15:33,920
think with disc detective we may not

428
00:15:38,389 --> 00:15:36,000
find too many like that because a lot of

429
00:15:41,829 --> 00:15:38,399
the white dwarfs are just way too faint

430
00:15:43,189 --> 00:15:41,839
to be detected in all of the wise bands

431
00:15:45,350 --> 00:15:43,199
that we're looking at so when you when

432
00:15:47,350 --> 00:15:45,360
we look at the disk detective website

433
00:15:50,069 --> 00:15:47,360
you'll see that we're looking at all

434
00:15:52,550 --> 00:15:50,079
four of the different infrared channels

435
00:15:55,110 --> 00:15:52,560
that wise was detecting

436
00:15:57,430 --> 00:15:55,120
stars and galaxies in and white dwarfs

437
00:15:59,749 --> 00:15:57,440
because they're so faint and so far away

438
00:16:01,509 --> 00:15:59,759

typically you only catch them in a

439
00:16:03,030 --> 00:16:01,519
couple of the wise channels so the way

440
00:16:06,389 --> 00:16:03,040
we selected our

441
00:16:08,389 --> 00:16:06,399
sample of stars on disk detective was

442
00:16:11,910 --> 00:16:08,399
actually looking for things that had

443
00:16:13,749 --> 00:16:11,920
detections at all four wavelengths so i

444
00:16:15,749 --> 00:16:13,759
don't actually know how many white

445
00:16:17,590 --> 00:16:15,759
dwarfs we would find in this one

446
00:16:20,870 --> 00:16:17,600
maybe not very many at all maybe we'll

447
00:16:23,829 --> 00:16:20,880
find some planetary nebulae or red giant

448
00:16:25,749 --> 00:16:23,839
stars that might be very dusty too and

449
00:16:28,870 --> 00:16:25,759
those also would tell us something about

450
00:16:31,590 --> 00:16:28,880
the future of our sun because

451
00:16:35,350 --> 00:16:31,600
you know maybe the dust that these red

452
00:16:36,870 --> 00:16:35,360
giant stars push off are enough to

453
00:16:39,829 --> 00:16:36,880
explain some of the things that we see

454
00:16:41,430 --> 00:16:39,839
around white dwarfs as well

455
00:16:44,230 --> 00:16:41,440
that's cool that's gonna be my mission

456
00:16:45,670 --> 00:16:44,240
then to try some wipe to white dwarfs

457
00:16:46,949 --> 00:16:45,680
great so it's a very cool little

458
00:16:49,350 --> 00:16:46,959
platform because i had to play with it

459
00:16:51,509 --> 00:16:49,360
um a couple of days ago and it's uh it's

460
00:16:53,509 --> 00:16:51,519
very easy it's very i like this universe

461
00:16:56,150 --> 00:16:53,519
it's universal interface as well i think

462
00:16:58,069 --> 00:16:56,160
it's very cool but how do you think like

463
00:16:59,430 --> 00:16:58,079

um like human factors will come into

464
00:17:00,629 --> 00:16:59,440
play with this because it's going to be

465
00:17:01,749 --> 00:17:00,639
you're looking at an image and you're

466
00:17:04,789 --> 00:17:01,759
trying to find

467
00:17:07,270 --> 00:17:04,799
um stars with disks around them um i

468
00:17:09,750 --> 00:17:07,280
know that previous projects in xenoverse

469
00:17:10,630 --> 00:17:09,760
have you know looked at you know human

470
00:17:12,470 --> 00:17:10,640
um

471
00:17:14,630 --> 00:17:12,480
influence you know about

472
00:17:16,230 --> 00:17:14,640
selection bias and stuff how do you

473
00:17:17,669 --> 00:17:16,240
think that's going to affect your

474
00:17:20,710 --> 00:17:17,679
results

475
00:17:23,270 --> 00:17:20,720
maybe laura should talk maybe laura good

476
00:17:24,470 --> 00:17:23,280
question for laura yeah yeah yeah

477
00:17:26,230 --> 00:17:24,480
so um

478
00:17:29,350 --> 00:17:26,240
all of the zuniverse projects kind of

479
00:17:31,510 --> 00:17:29,360
work on the same um use the same method

480
00:17:33,510 --> 00:17:31,520
and that is that we get multiple people

481
00:17:34,549 --> 00:17:33,520
to look at every object

482
00:17:41,029 --> 00:17:34,559
so

483
00:17:43,830 --> 00:17:41,039
is better at doing these and or you know

484
00:17:45,430 --> 00:17:43,840
we kind of average things out at the end

485
00:17:47,110 --> 00:17:45,440
and there is kind of some data reduction

486
00:17:50,150 --> 00:17:47,120
that happens when i sort of find a lot

487
00:17:52,870 --> 00:17:50,160
final catalogs being collected together

488
00:17:54,710 --> 00:17:52,880

um but generally speaking it's just the

489
00:17:57,830 --> 00:17:54,720
power of averages right the more people

490
00:18:01,029 --> 00:17:57,840
you get to look at something the more um

491
00:18:02,870 --> 00:18:01,039
reliable the the result is

492
00:18:04,789 --> 00:18:02,880
so um and

493
00:18:06,310 --> 00:18:04,799
it really depends on the project because

494
00:18:08,390 --> 00:18:06,320
so different projects we get different

495
00:18:10,470 --> 00:18:08,400
numbers of people to look at each in

496
00:18:12,230 --> 00:18:10,480
each object and we kind of tweak that as

497
00:18:16,390 --> 00:18:12,240
the project goes along and we find out

498
00:18:18,870 --> 00:18:16,400
how good people are at a particular task

499
00:18:21,190 --> 00:18:18,880
okay so i have i think let's move on now

500
00:18:22,470 --> 00:18:21,200
i was able to recall all of my windows

501
00:18:24,950 --> 00:18:22,480
that were up thank you ian for giving me

502
00:18:26,789 --> 00:18:24,960
an opportunity to do that as i was

503
00:18:28,549 --> 00:18:26,799
frantically closing them earlier so i'm

504
00:18:30,870 --> 00:18:28,559
back up and and let's let's start

505
00:18:32,070 --> 00:18:30,880
introducing the dis detective uh website

506
00:18:35,110 --> 00:18:32,080
now i have

507
00:18:37,110 --> 00:18:35,120
uh a video that was made at goddard and

508
00:18:39,190 --> 00:18:37,120
uh i think what we talked about doing

509
00:18:41,909 --> 00:18:39,200
was i will show that on my screen share

510
00:18:44,230 --> 00:18:41,919
but the audio won't be uh able to be

511
00:18:47,350 --> 00:18:44,240
heard so uh mark is going to make some

512
00:18:49,350 --> 00:18:47,360
comments over as uh as i do that so let

513
00:18:52,789 --> 00:18:49,360

me start my screen share

514
00:18:58,470 --> 00:18:56,789
and uh i will get that video up here

515
00:19:00,710 --> 00:18:58,480
i've got the script in front of me so

516
00:19:02,950 --> 00:19:00,720
i'm going to do a live reading of it oh

517
00:19:04,310 --> 00:19:02,960
wow okay well i my screen share button

518
00:19:05,990 --> 00:19:04,320
has to work or else nothing's going to

519
00:19:07,669 --> 00:19:06,000
happen i'm pushing it

520
00:19:13,430 --> 00:19:07,679
mark i dare you to do it in a will

521
00:19:13,440 --> 00:19:16,470
okay

522
00:19:19,830 --> 00:19:17,909
oh come on

523
00:19:22,070 --> 00:19:19,840
this is crazy

524
00:19:24,870 --> 00:19:22,080
the wise machine

525
00:19:29,909 --> 00:19:24,880
imaged about uh half a billion

526
00:19:33,990 --> 00:19:31,590
every button is working but the screen

527
00:19:35,830 --> 00:19:34,000
share now this has been this is one of

528
00:19:37,669 --> 00:19:35,840
those things where it's just it just

529
00:19:39,990 --> 00:19:37,679
figures um

530
00:19:43,029 --> 00:19:40,000
john could i ask you to uh pull up the

531
00:19:45,190 --> 00:19:43,039
url that is in the chat box for the uh

532
00:19:47,590 --> 00:19:45,200
oh actually i will send you the urls

533
00:19:50,789 --> 00:19:47,600
just right here uh can my screen share

534
00:19:52,950 --> 00:19:50,799
button seems to not want to work okay

535
00:19:54,230 --> 00:19:52,960
there is an is a link to nasa if you

536
00:19:55,510 --> 00:19:54,240
could click on that and pull up the

537
00:19:56,630 --> 00:19:55,520
video

538
00:19:58,789 --> 00:19:56,640

um

539
00:19:59,669 --> 00:19:58,799
i'd appreciate it

540
00:20:01,990 --> 00:19:59,679
yes

541
00:20:08,230 --> 00:20:02,000
i will do that

542
00:20:12,310 --> 00:20:10,150
and if you just hit your foot the full

543
00:20:18,630 --> 00:20:12,320
screen on the video and then push play

544
00:20:23,830 --> 00:20:21,669
yes except for some reason

545
00:20:24,710 --> 00:20:23,840
is your screenshot not working either

546
00:20:30,549 --> 00:20:24,720
no

547
00:20:35,029 --> 00:20:32,549
it helps when your window has a scroll

548
00:20:39,990 --> 00:20:35,039
bar

549
00:20:43,750 --> 00:20:42,390
so screen share first and then do full

550
00:20:44,630 --> 00:20:43,760
screen on the video

551
00:20:49,270 --> 00:20:44,640
yeah

552
00:20:53,110 --> 00:20:51,990
it's not working for me either oh great

553
00:20:57,110 --> 00:20:53,120
okay

554
00:21:01,270 --> 00:20:58,549
yeah i'll give it a go i've got the

555
00:21:05,990 --> 00:21:01,280
video up i'll see if i can share it now

556
00:21:11,270 --> 00:21:08,630
so technical problems so if that that's

557
00:21:16,950 --> 00:21:13,669
there it is thank goodness okay good so

558
00:21:19,830 --> 00:21:16,960
there you so we see ian's screen um okay

559
00:21:21,350 --> 00:21:19,840
go ahead and and uh make it if you can

560
00:21:22,950 --> 00:21:21,360
go ahead at the full screen and then

561
00:21:27,270 --> 00:21:22,960
push play

562
00:21:27,280 --> 00:21:31,830
oh no just hit escape

563
00:21:35,990 --> 00:21:34,149

it went away

564
00:21:39,909 --> 00:21:36,000
hey yo why don't you all go to youtube

565
00:21:44,390 --> 00:21:43,190
okay go ahead john go ahead mark

566
00:21:45,590 --> 00:21:44,400
start yapping

567
00:21:47,990 --> 00:21:45,600
yeah go ahead

568
00:21:50,070 --> 00:21:48,000
can you scroll scroll down a little bit

569
00:21:52,549 --> 00:21:50,080
ian

570
00:21:54,149 --> 00:21:52,559
yeah was it working or did it freeze up

571
00:21:55,430 --> 00:21:54,159
well now we're looking at the upper left

572
00:22:03,110 --> 00:21:55,440
corner

573
00:22:03,120 --> 00:22:08,230
yes

574
00:22:11,669 --> 00:22:09,830
okay so we're having technical this is

575
00:22:16,549 --> 00:22:11,679
kind of weird sorry one second though so

576
00:22:21,510 --> 00:22:18,630
what can you see there this is yeah it's

577
00:22:25,430 --> 00:22:21,520
not working it started up and then

578
00:22:27,830 --> 00:22:25,440
it stopped oh great okay well um that's

579
00:22:29,110 --> 00:22:27,840
so let's let's improvise so

580
00:22:31,029 --> 00:22:29,120
let's go ahead and talk about what the

581
00:22:33,110 --> 00:22:31,039
video was going to say so it was a it's

582
00:22:35,430 --> 00:22:33,120
an introduction into this into this

583
00:22:36,470 --> 00:22:35,440
detective and to the into the uh

584
00:22:38,390 --> 00:22:36,480
uh

585
00:22:39,830 --> 00:22:38,400
the the citizen science project you you

586
00:22:41,190 --> 00:22:39,840
had started so let's go ahead and start

587
00:22:43,190 --> 00:22:41,200
talking about that what are you hoping

588
00:22:45,830 --> 00:22:43,200

to do with this detective

589
00:22:46,630 --> 00:22:45,840
mark another quick summary

590
00:22:48,390 --> 00:22:46,640
so

591
00:22:50,390 --> 00:22:48,400
as we were saying

592
00:22:52,230 --> 00:22:50,400
a big quest to astronomers for the last

593
00:22:54,549 --> 00:22:52,240
few decades has been discovering

594
00:22:56,789 --> 00:22:54,559
exoplanets

595
00:22:58,310 --> 00:22:56,799
one of the ways that we do this is we

596
00:23:00,070 --> 00:22:58,320
search for young stars that are

597
00:23:02,630 --> 00:23:00,080
surrounded by dust

598
00:23:04,870 --> 00:23:02,640
dusty indicates photoplanetary discs and

599
00:23:06,470 --> 00:23:04,880
three discs

600
00:23:08,390 --> 00:23:06,480
because those are the environments where

601
00:23:11,750 --> 00:23:08,400
planets form that's an environment where

602
00:23:15,350 --> 00:23:13,430
the wise mission

603
00:23:17,029 --> 00:23:15,360
has just been this remarkable tool for

604
00:23:19,350 --> 00:23:17,039
finding places

605
00:23:22,149 --> 00:23:19,360
from 2010 to 2011 the wise mission

606
00:23:24,630 --> 00:23:22,159
scanned the entire sky

607
00:23:25,990 --> 00:23:24,640
and the images are just spectacular i

608
00:23:27,029 --> 00:23:26,000
hope we've had a chance to see some of

609
00:23:30,630 --> 00:23:27,039
them

610
00:23:35,110 --> 00:23:30,640
you know these green magenta clouds

611
00:23:37,110 --> 00:23:35,120
of gas and dust and yellow stars

612
00:23:39,110 --> 00:23:37,120
but anyway

613
00:23:40,630 --> 00:23:39,120

john and i are most interested in the

614
00:23:42,789 --> 00:23:40,640
discs so

615
00:23:44,390 --> 00:23:42,799
we wanted to try to find all of the

616
00:23:45,190 --> 00:23:44,400
discs

617
00:23:47,510 --> 00:23:45,200
and

618
00:23:49,190 --> 00:23:47,520
in three quarters of a million objects

619
00:23:50,950 --> 00:23:49,200
you know there are going to be discs

620
00:23:52,549 --> 00:23:50,960
everywhere

621
00:23:54,470 --> 00:23:52,559
but here's the trick

622
00:23:57,430 --> 00:23:54,480
when you see a source

623
00:23:58,710 --> 00:23:57,440
in the wise kind

624
00:24:01,430 --> 00:23:58,720
it's

625
00:24:03,270 --> 00:24:01,440
hard to tell by a computer anyway

626
00:24:05,430 --> 00:24:03,280
whether it's

627
00:24:07,830 --> 00:24:05,440
likely to be a star with a disc or

628
00:24:11,510 --> 00:24:07,840
whether it's more likely to be a

629
00:24:13,350 --> 00:24:11,520
background galaxy or an active galactic

630
00:24:15,510 --> 00:24:13,360
nucleus or

631
00:24:18,710 --> 00:24:15,520
an asteroid or a

632
00:24:20,630 --> 00:24:18,720
planetary nebula or even an image

633
00:24:22,310 --> 00:24:20,640
artifact

634
00:24:24,549 --> 00:24:22,320
and what we learned

635
00:24:26,710 --> 00:24:24,559
looking at these things what

636
00:24:28,310 --> 00:24:26,720
several scientists

637
00:24:31,510 --> 00:24:28,320
was that

638
00:24:34,230 --> 00:24:31,520

you have to check them all by eye

639
00:24:35,750 --> 00:24:34,240
you would try to program computers to to

640
00:24:37,669 --> 00:24:35,760
sort through the

641
00:24:39,669 --> 00:24:37,679
three ports of brilliant images and you

642
00:24:40,470 --> 00:24:39,679
could only get so far you just have to

643
00:24:44,830 --> 00:24:40,480
use

644
00:24:51,350 --> 00:24:48,230
so with this in mind we launched

645
00:24:53,990 --> 00:24:51,360
disk detected back

646
00:24:56,789 --> 00:24:54,000
and at this detective you see

647
00:24:59,190 --> 00:24:56,799
animated flip flops

648
00:25:00,549 --> 00:24:59,200
of images from wise

649
00:25:03,029 --> 00:25:00,559
from

650
00:25:05,830 --> 00:25:03,039
the two mass sky survey

651
00:25:08,710 --> 00:25:05,840
and from the digitized palomar sky

652
00:25:10,390 --> 00:25:08,720
survey and some images also from the

653
00:25:11,830 --> 00:25:10,400
sloan

654
00:25:13,750 --> 00:25:11,840
survey

655
00:25:15,430 --> 00:25:13,760
and you see flipbooks of these images

656
00:25:16,630 --> 00:25:15,440
and several wavelengths

657
00:25:18,789 --> 00:25:16,640
and

658
00:25:20,789 --> 00:25:18,799
looking at those images

659
00:25:21,909 --> 00:25:20,799
you're able to spot

660
00:25:25,430 --> 00:25:21,919
the

661
00:25:28,630 --> 00:25:25,440
positives

662
00:25:30,470 --> 00:25:28,640
the objects we want to discard

663
00:25:33,750 --> 00:25:30,480

in a sort of natural way it's almost

664
00:25:35,750 --> 00:25:33,760
like spotting prey in a dense jungle

665
00:25:38,870 --> 00:25:35,760
something that the human eye is very

666
00:25:38,880 --> 00:25:41,110
so

667
00:25:45,590 --> 00:25:42,950
what we're going to do is

668
00:25:47,510 --> 00:25:45,600
with your help once we find

669
00:25:49,590 --> 00:25:47,520
all these new disks that we hope to find

670
00:25:50,630 --> 00:25:49,600
in the data we're going to follow them

671
00:25:52,950 --> 00:25:50,640
up with

672
00:25:55,190 --> 00:25:52,960
the hubble space telescope james webb

673
00:25:56,390 --> 00:25:55,200
space telescope with ground-based space

674
00:25:57,830 --> 00:25:56,400
telescopes

675
00:25:59,750 --> 00:25:57,840
and these are going to be great targets

676
00:26:02,149 --> 00:25:59,760
to search for planets around

677
00:26:04,070 --> 00:26:02,159
extrasolar planets we'll learn more

678
00:26:06,710 --> 00:26:04,080
about how planet formation occurs where

679
00:26:09,190 --> 00:26:06,720
it occurs we hope to find new groups of

680
00:26:11,190 --> 00:26:09,200
young stars and generally study how

681
00:26:14,230 --> 00:26:11,200
planetary systems evolve during the

682
00:26:33,909 --> 00:26:17,669
so we're looking forward to working

683
00:26:39,430 --> 00:26:36,149
that was a piece of whale song

684
00:26:43,830 --> 00:26:41,590
um so i just got one question with uh i

685
00:26:46,310 --> 00:26:43,840
mean a recent thing that's come up um

686
00:26:48,789 --> 00:26:46,320
with uh some infrared studies of other

687
00:26:51,110 --> 00:26:48,799
stars is the detection of

688
00:26:53,830 --> 00:26:51,120

dust and cometary material are you

689
00:26:55,350 --> 00:26:53,840
hoping to find uh star systems like that

690
00:26:58,870 --> 00:26:55,360
like the former whole system are you

691
00:27:01,430 --> 00:27:00,390
anything with a debris disc i suppose

692
00:27:03,909 --> 00:27:01,440
isn't it

693
00:27:06,549 --> 00:27:03,919
yeah well so one of our science team

694
00:27:09,830 --> 00:27:06,559
members debbie padgett is

695
00:27:13,110 --> 00:27:09,840
a part of the wise science team

696
00:27:16,870 --> 00:27:13,120
and they actually used wise to look for

697
00:27:21,909 --> 00:27:19,510
nearby stars that have their distances

698
00:27:23,830 --> 00:27:21,919
measured and so it was a subset of all

699
00:27:25,909 --> 00:27:23,840
the different sources that wise had

700
00:27:27,430 --> 00:27:25,919
detected a very small subset of you know

701
00:27:28,470 --> 00:27:27,440
when you think about three quarters of a

702
00:27:30,950 --> 00:27:28,480
billion

703
00:27:33,590 --> 00:27:30,960
but what they did is they did find

704
00:27:35,350 --> 00:27:33,600
maybe a few dozen really good candidate

705
00:27:36,870 --> 00:27:35,360
debris disk sources and then they

706
00:27:39,029 --> 00:27:36,880
followed them up

707
00:27:41,110 --> 00:27:39,039
with the hubble space telescope and some

708
00:27:41,990 --> 00:27:41,120
of the targets that they looked at

709
00:27:43,909 --> 00:27:42,000
have

710
00:27:45,990 --> 00:27:43,919
discs around them that you actually can

711
00:27:48,630 --> 00:27:46,000
image very nicely very much like fomo

712
00:27:50,470 --> 00:27:48,640
hut or beta pictoris some of these

713
00:27:53,590 --> 00:27:50,480

really famous debris discs that have

714
00:27:55,190 --> 00:27:53,600
these beautiful images so that's exactly

715
00:27:57,909 --> 00:27:55,200
what we're hoping to do just sort of on

716
00:28:01,350 --> 00:27:57,919
a larger scale if possible

717
00:28:04,789 --> 00:28:01,360
okay so i have a finally a screenshot up

718
00:28:06,950 --> 00:28:04,799
of the website um and so let's go ahead

719
00:28:09,350 --> 00:28:06,960
and start showing people

720
00:28:11,669 --> 00:28:09,360
what they need to do so i don't have i

721
00:28:13,269 --> 00:28:11,679
don't have any kind of um

722
00:28:14,710 --> 00:28:13,279
uh

723
00:28:16,630 --> 00:28:14,720
account with well i do have an account

724
00:28:19,029 --> 00:28:16,640
with zooniverse but uh why don't you

725
00:28:21,909 --> 00:28:19,039
need it i don't think you need it

726
00:28:24,470 --> 00:28:21,919
okay so yeah just get started okay so i

727
00:28:26,230 --> 00:28:24,480
start classifying mm-hmm

728
00:28:28,470 --> 00:28:26,240
right so the first thing you'll see is a

729
00:28:31,269 --> 00:28:28,480
little tutorial that comes up and tries

730
00:28:33,830 --> 00:28:31,279
to walk you through uh the whole process

731
00:28:36,149 --> 00:28:33,840
in a very hopefully intuitive way i mean

732
00:28:37,830 --> 00:28:36,159
the zuniverse people do a really great

733
00:28:39,830 --> 00:28:37,840
job with this so

734
00:28:41,350 --> 00:28:39,840
you know when we were when mark and i

735
00:28:43,510 --> 00:28:41,360
and and the other science team members

736
00:28:45,669 --> 00:28:43,520
were first designing this thing you know

737
00:28:48,070 --> 00:28:45,679
i had made a little powerpoint slide of

738
00:28:50,070 --> 00:28:48,080

what we thought it would look like and

739
00:28:51,750 --> 00:28:50,080
uh yeah they did a much better design

740
00:28:53,909 --> 00:28:51,760
job than i ever

741
00:28:55,590 --> 00:28:53,919
could have done so the url that i'm at

742
00:28:57,430 --> 00:28:55,600
is disdetective.org

743
00:28:58,950 --> 00:28:57,440
very simple to remember and this is what

744
00:29:00,549 --> 00:28:58,960
you're presented with

745
00:29:02,789 --> 00:29:00,559
i clicked on the start classifying

746
00:29:04,710 --> 00:29:02,799
button and then and now this comes up so

747
00:29:06,230 --> 00:29:04,720
it says using the interface we find new

748
00:29:07,669 --> 00:29:06,240
debris disk stars by looking at flip

749
00:29:09,990 --> 00:29:07,679
books of images

750
00:29:11,990 --> 00:29:10,000
and um

751
00:29:14,230 --> 00:29:12,000
so click the play button to start one

752
00:29:16,070 --> 00:29:14,240
flip book so

753
00:29:17,430 --> 00:29:16,080
right yeah so you'll see

754
00:29:20,549 --> 00:29:17,440
different images at different

755
00:29:23,990 --> 00:29:20,559
wavelengths from the three surveys that

756
00:29:25,909 --> 00:29:24,000
were uh that we're primarily using so

757
00:29:28,149 --> 00:29:25,919
the first ones start invisible

758
00:29:29,909 --> 00:29:28,159
wavelengths and then they go on to the

759
00:29:31,669 --> 00:29:29,919
near infrared which is just which is

760
00:29:33,110 --> 00:29:31,679
light that's just a bit redder than what

761
00:29:36,149 --> 00:29:33,120
our eyes can see

762
00:29:38,389 --> 00:29:36,159
all the way to the wise uh wavelengths

763
00:29:41,029 --> 00:29:38,399

the wise images which are in the mid

764
00:29:44,310 --> 00:29:41,039
infrared so these this is very

765
00:29:46,950 --> 00:29:44,320
red light and the idea is that these are

766
00:29:49,190 --> 00:29:46,960
all stars that we think are brighter in

767
00:29:51,110 --> 00:29:49,200
the infrared than they are in the

768
00:29:53,029 --> 00:29:51,120
visible but we need to weed out all the

769
00:29:54,789 --> 00:29:53,039
galaxies and the

770
00:29:56,549 --> 00:29:54,799
other stuff so as you're flipping

771
00:29:59,590 --> 00:29:56,559
through you'll see

772
00:30:01,269 --> 00:29:59,600
a couple of different uh you might see

773
00:30:03,750 --> 00:30:01,279
just something that looks like a blob

774
00:30:05,830 --> 00:30:03,760
right so this one looks like a blob

775
00:30:07,590 --> 00:30:05,840
it's just a different size blob in all

776
00:30:09,029 --> 00:30:07,600
these images because each of these

777
00:30:11,350 --> 00:30:09,039
surveys

778
00:30:13,510 --> 00:30:11,360
could resolve

779
00:30:15,909 --> 00:30:13,520
images better or worse so

780
00:30:17,110 --> 00:30:15,919
two masks sort of had the best spatial

781
00:30:19,110 --> 00:30:17,120
resolution

782
00:30:21,590 --> 00:30:19,120
followed by the visible with the pass

783
00:30:23,269 --> 00:30:21,600
images and unfortunately wise even

784
00:30:25,909 --> 00:30:23,279
though it's a great

785
00:30:28,149 --> 00:30:25,919
great telescope in a lot of ways it has

786
00:30:30,549 --> 00:30:28,159
sort of blurry vision compared to the

787
00:30:33,190 --> 00:30:30,559
other survey so the the

788
00:30:34,950 --> 00:30:33,200

a star will look more blobby as you get

789
00:30:35,830 --> 00:30:34,960
to longer wavelengths

790
00:30:37,750 --> 00:30:35,840
so

791
00:30:39,750 --> 00:30:37,760
this one we consider a pretty good

792
00:30:42,870 --> 00:30:39,760
candidate because it looks just like a

793
00:30:43,909 --> 00:30:42,880
single blob within that red circle so if

794
00:30:46,470 --> 00:30:43,919
you uh

795
00:30:49,190 --> 00:30:46,480
continue through it'll sort of tell you

796
00:30:51,909 --> 00:30:49,200
i think uh what to look for if you click

797
00:30:53,909 --> 00:30:51,919
on the little continue button okay okay

798
00:30:55,830 --> 00:30:53,919
so yeah on the bottom it also says what

799
00:30:57,669 --> 00:30:55,840
instrument was there and the wavelength

800
00:30:59,830 --> 00:30:57,679
that i'm right yeah just to help you and

801
00:31:01,350 --> 00:30:59,840
you can drag it along and look around if

802
00:31:03,590 --> 00:31:01,360
if you want to take more time for

803
00:31:05,430 --> 00:31:03,600
example or start i have a debris disk it

804
00:31:07,430 --> 00:31:05,440
should be mo it should mostly be

805
00:31:08,789 --> 00:31:07,440
contained within the red circle and this

806
00:31:11,430 --> 00:31:08,799
red circle just

807
00:31:12,549 --> 00:31:11,440
it's always the same size yeah that's

808
00:31:13,590 --> 00:31:12,559
roughly

809
00:31:21,909 --> 00:31:13,600
the

810
00:31:24,070 --> 00:31:21,919
wavelength okay because that's we're

811
00:31:26,310 --> 00:31:24,080
really relying on that longest that

812
00:31:30,070 --> 00:31:26,320
reddest color to tell us whether there's

813
00:31:31,590 --> 00:31:30,080

dust around these stars or not and so

814
00:31:33,350 --> 00:31:31,600
what we're doing is we're looking at the

815
00:31:35,110 --> 00:31:33,360
shorter wavelengths where we have more

816
00:31:37,430 --> 00:31:35,120
ability to resolve things out or to

817
00:31:39,909 --> 00:31:37,440
image things to see whether there are

818
00:31:42,149 --> 00:31:39,919
multiple objects within that circle or

819
00:31:43,990 --> 00:31:42,159
whether there's a galaxy that looks like

820
00:31:46,710 --> 00:31:44,000
a galaxy at shorter wavelengths but just

821
00:31:47,830 --> 00:31:46,720
looks like a blob at longer wavelengths

822
00:31:49,269 --> 00:31:47,840
and so

823
00:31:51,269 --> 00:31:49,279
those are the kinds of things that we

824
00:31:52,149 --> 00:31:51,279
want to get rid of if we can

825
00:31:54,230 --> 00:31:52,159
okay

826
00:31:55,590 --> 00:31:54,240
and it said that now i'm being talking

827
00:31:56,630 --> 00:31:55,600
about a scrub bar now you want to talk

828
00:31:58,149 --> 00:31:56,640
about that a little bit sometimes you

829
00:32:00,470 --> 00:31:58,159
need yeah

830
00:32:01,669 --> 00:32:00,480
if you right so tony's now clicking on

831
00:32:03,269 --> 00:32:01,679
this thing so if you want to have

832
00:32:05,190 --> 00:32:03,279
control looking at all the different

833
00:32:06,470 --> 00:32:05,200
wavelengths or going to a particular

834
00:32:07,990 --> 00:32:06,480
image you can

835
00:32:09,830 --> 00:32:08,000
slide that around

836
00:32:12,389 --> 00:32:09,840
however you want to do it to really

837
00:32:14,310 --> 00:32:12,399
explore the images as much as possible

838
00:32:17,190 --> 00:32:14,320

right so here's a digital sky survey 2

839
00:32:18,470 --> 00:32:17,200
image uh this one has two masks

840
00:32:21,590 --> 00:32:18,480
um

841
00:32:24,149 --> 00:32:21,600
y's there's a wise image

842
00:32:25,909 --> 00:32:24,159
and these are all of the same object yep

843
00:32:29,190 --> 00:32:25,919
yep that's the same object just in

844
00:32:30,230 --> 00:32:29,200
different colors okay so as you go

845
00:32:32,310 --> 00:32:30,240
through the flip book you should pay

846
00:32:33,990 --> 00:32:32,320
attention to what survey each image is

847
00:32:35,269 --> 00:32:34,000
from uh you'll be looking for different

848
00:32:37,430 --> 00:32:35,279
features and images for different

849
00:32:39,110 --> 00:32:37,440
surveys for example non-circular objects

850
00:32:41,750 --> 00:32:39,120
and images from the dss2 and two mass

851
00:32:45,029 --> 00:32:41,760
surveys is a sign that is not a disc is

852
00:32:46,870 --> 00:32:45,039
that true here um non-circular is that

853
00:32:48,389 --> 00:32:46,880
circular that looks circular to me it's

854
00:32:49,909 --> 00:32:48,399
yeah these are pretty circular now

855
00:32:53,590 --> 00:32:49,919
obviously you know there's going to be

856
00:32:56,310 --> 00:32:53,600
imperfections if if uh

857
00:32:59,269 --> 00:32:56,320
a lot of our users have already found

858
00:33:02,470 --> 00:32:59,279
weird things in the data like star like

859
00:33:05,669 --> 00:33:02,480
satellite trails or asteroid trails so

860
00:33:07,590 --> 00:33:05,679
you might find a couple weird things but

861
00:33:09,990 --> 00:33:07,600
that's okay

862
00:33:11,190 --> 00:33:10,000
weirder the better yeah exactly who

863
00:33:12,789 --> 00:33:11,200

knows

864
00:33:14,310 --> 00:33:12,799
all right so now you classify after you

865
00:33:16,549 --> 00:33:14,320
watch the flipbook at least once you can

866
00:33:18,070 --> 00:33:16,559
select a classification for the star

867
00:33:20,070 --> 00:33:18,080
this is a good candidate since it is

868
00:33:23,110 --> 00:33:20,080
round and entirely contained within the

869
00:33:25,350 --> 00:33:23,120
circle uh go ahead and select

870
00:33:29,909 --> 00:33:25,360
none of the above slash good candidate

871
00:33:34,870 --> 00:33:32,310
none of the above or uh

872
00:33:43,430 --> 00:33:34,880
yeah it's all the way down there

873
00:33:46,789 --> 00:33:45,590
and you'll get a voicemail for mark with

874
00:33:48,630 --> 00:33:46,799
that noise

875
00:33:50,789 --> 00:33:48,640
every time you do one he's done it about

876
00:33:56,389 --> 00:33:50,799
ten thousand times already oh good well

877
00:34:01,269 --> 00:33:59,269
okay so here we are onto a onto a net

878
00:34:03,750 --> 00:34:01,279
onto another one here right yeah so you

879
00:34:05,909 --> 00:34:03,760
kind you closed out the tutorial but

880
00:34:07,350 --> 00:34:05,919
um no that's okay don't worry about it

881
00:34:09,430 --> 00:34:07,360
you can always get it back if you want

882
00:34:11,190 --> 00:34:09,440
but if you go up to the top you see you

883
00:34:12,389 --> 00:34:11,200
have a couple of buttons up there that

884
00:34:14,310 --> 00:34:12,399
you can

885
00:34:16,069 --> 00:34:14,320
kind of play around with they should

886
00:34:18,149 --> 00:34:16,079
tell you what they are

887
00:34:20,629 --> 00:34:18,159
yeah there we go well now yeah there you

888
00:34:22,389 --> 00:34:20,639

go you got back to the tutorial you can

889
00:34:23,669 --> 00:34:22,399
close that out i think

890
00:34:24,470 --> 00:34:23,679
if you go to the one that looks like a

891
00:34:25,909 --> 00:34:24,480
book

892
00:34:28,629 --> 00:34:25,919
and click on that

893
00:34:30,230 --> 00:34:28,639
yeah that gives you different examples

894
00:34:32,230 --> 00:34:30,240
of all the different things that you

895
00:34:34,310 --> 00:34:32,240
might run across

896
00:34:35,589 --> 00:34:34,320
good candidate so you play this to get a

897
00:34:37,430 --> 00:34:35,599
good candidate

898
00:34:39,349 --> 00:34:37,440
right yeah and so people can look

899
00:34:41,190 --> 00:34:39,359
through and sort of get a feel for what

900
00:34:43,510 --> 00:34:41,200
they're looking for

901
00:34:45,430 --> 00:34:43,520
and and there are a lot of different

902
00:34:47,190 --> 00:34:45,440
you know

903
00:34:49,669 --> 00:34:47,200
mostly what you'll find are things like

904
00:34:51,430 --> 00:34:49,679
the galaxy right where they look very

905
00:34:53,030 --> 00:34:51,440
much like a galaxy

906
00:34:54,950 --> 00:34:53,040
at the shorter wavelengths but when you

907
00:34:56,710 --> 00:34:54,960
get to the longer wavelengths it looks

908
00:34:58,310 --> 00:34:56,720
looks more like a star and those are the

909
00:34:59,829 --> 00:34:58,320
ones we really want to put in a

910
00:35:01,109 --> 00:34:59,839
different category

911
00:35:03,829 --> 00:35:01,119
okay so we're looking for things that

912
00:35:06,550 --> 00:35:03,839
are round stay inside

913
00:35:09,349 --> 00:35:06,560

the circle and don't look like any of

914
00:35:11,109 --> 00:35:09,359
these things right that's okay you got

915
00:35:12,870 --> 00:35:11,119
it okay

916
00:35:14,829 --> 00:35:12,880
and if you close that out one other

917
00:35:17,030 --> 00:35:14,839
thing you can do

918
00:35:20,069 --> 00:35:17,040
uh click on the

919
00:35:22,390 --> 00:35:20,079
the little what looks like a

920
00:35:25,349 --> 00:35:22,400
uh infinity

921
00:35:27,270 --> 00:35:25,359
no sorry on the top there's a star and

922
00:35:29,430 --> 00:35:27,280
then there's a little like word bubble

923
00:35:31,829 --> 00:35:29,440
so click on the word bubble

924
00:35:34,790 --> 00:35:31,839
if you go there that'll take you

925
00:35:38,310 --> 00:35:34,800
to the top the talk area

926
00:35:40,790 --> 00:35:38,320
and if if you have uh an account i think

927
00:35:43,589 --> 00:35:40,800
you'll see more more things there but

928
00:35:46,390 --> 00:35:43,599
basically if you find an unusual object

929
00:35:48,630 --> 00:35:46,400
you can uh

930
00:35:50,870 --> 00:35:48,640
you know start a discussion about it or

931
00:35:52,069 --> 00:35:50,880
tag some things about it and and this is

932
00:35:53,829 --> 00:35:52,079
something that i think most of the

933
00:35:56,310 --> 00:35:53,839
zuniverse sites have something similar

934
00:35:58,470 --> 00:35:56,320
to this and i it's it's really cool

935
00:36:00,550 --> 00:35:58,480
because this is where everyone gets to

936
00:36:03,190 --> 00:36:00,560
talk amongst themselves

937
00:36:05,670 --> 00:36:03,200
uh about these different objects and and

938
00:36:08,069 --> 00:36:05,680

uh ask questions of both the scientists

939
00:36:10,069 --> 00:36:08,079
and the the xenoverse people

940
00:36:12,550 --> 00:36:10,079
so it's got a social aspect as well this

941
00:36:14,550 --> 00:36:12,560
is this is pretty good yep

942
00:36:16,630 --> 00:36:14,560
i don't know if laura wants to talk more

943
00:36:18,950 --> 00:36:16,640
about these kinds of things in relation

944
00:36:21,030 --> 00:36:18,960
to the others universe projects but this

945
00:36:22,069 --> 00:36:21,040
is something that i think is really cool

946
00:36:29,990 --> 00:36:22,079
yeah

947
00:36:32,790 --> 00:36:30,000
realized was important um during our

948
00:36:35,109 --> 00:36:32,800
very first project galaxy zoo um

949
00:36:37,670 --> 00:36:35,119
it's kind of where the science that you

950
00:36:39,990 --> 00:36:37,680
don't expect to happen happens i mean

951
00:36:42,390 --> 00:36:40,000
all xenoverse projects start with very

952
00:36:44,069 --> 00:36:42,400
kind of well-defined questions that need

953
00:36:46,150 --> 00:36:44,079
to be answered

954
00:36:47,829 --> 00:36:46,160
but it's the serendipitous stuff that

955
00:36:49,349 --> 00:36:47,839
comes out of people actually getting

956
00:36:52,829 --> 00:36:49,359
together and talking about science

957
00:36:57,349 --> 00:36:54,630
okay

958
00:37:03,109 --> 00:36:59,190
this time

959
00:37:13,670 --> 00:37:04,870
sorry we've we've got someone doing some

960
00:37:19,750 --> 00:37:16,550
okay so um apparently my

961
00:37:21,430 --> 00:37:19,760
i had one for galaxy zoo um but i don't

962
00:37:23,430 --> 00:37:21,440
know if that transferred over into

963
00:37:26,069 --> 00:37:23,440

xenoverse or not so

964
00:37:28,230 --> 00:37:26,079
yeah no worries yeah it's certainly it

965
00:37:30,230 --> 00:37:28,240
certainly should have done so i've

966
00:37:32,069 --> 00:37:30,240
forgotten my password yeah just at some

967
00:37:33,990 --> 00:37:32,079
point you might just want to hit reset

968
00:37:39,349 --> 00:37:34,000
your password and they'll send you i'll

969
00:37:43,670 --> 00:37:41,270
uh very well but you know that is that

970
00:37:45,670 --> 00:37:43,680
is a really important part of these and

971
00:37:48,230 --> 00:37:45,680
and i don't know laura do you remember

972
00:37:49,109 --> 00:37:48,240
of course you remember um there was a

973
00:37:56,069 --> 00:37:49,119
uh

974
00:37:58,150 --> 00:37:56,079
think it was galaxy zoo i can't remember

975
00:38:00,550 --> 00:37:58,160
the exact one anyway she she contributed

976
00:38:06,310 --> 00:38:00,560
to a paper yanni i think her name was

977
00:38:11,670 --> 00:38:09,190
it was an entirely new astronomical um

978
00:38:14,550 --> 00:38:11,680
object that had never been discovered

979
00:38:16,710 --> 00:38:14,560
before and um yep she's been in i think

980
00:38:18,790 --> 00:38:16,720
more than one paper actually and in fact

981
00:38:20,710 --> 00:38:18,800
at some point they even pointed the

982
00:38:23,030 --> 00:38:20,720
hubble telescope at this object to do

983
00:38:25,910 --> 00:38:23,040
follow-up observations so that's that's

984
00:38:27,829 --> 00:38:25,920
a superb example of the kind of exciting

985
00:38:30,150 --> 00:38:27,839
stuff that can happen when people get

986
00:38:32,150 --> 00:38:30,160
together and talk about the science that

987
00:38:34,390 --> 00:38:32,160
happens on zoo first projects so was

988
00:38:35,750 --> 00:38:34,400

that um feature built into galaxy zoo at

989
00:38:37,510 --> 00:38:35,760
the time were they able to discuss this

990
00:38:38,790 --> 00:38:37,520
thing or was this feature born out of

991
00:38:40,470 --> 00:38:38,800
the of discoveries like this where

992
00:38:42,069 --> 00:38:40,480
people were seeing things

993
00:38:43,750 --> 00:38:42,079
in these universe products and not

994
00:38:45,190 --> 00:38:43,760
knowing what they were and wanting to be

995
00:38:46,950 --> 00:38:45,200
able to talk about it is that where that

996
00:38:50,310 --> 00:38:46,960
kind of came from so the original

997
00:38:51,190 --> 00:38:50,320
projects had um forums just kind of uh

998
00:38:53,750 --> 00:38:51,200
your

999
00:38:57,109 --> 00:38:53,760
standard forum tools attached to them

1000
00:38:59,109 --> 00:38:57,119
and i believe galaxy zoo and munzu uh

1001
00:39:02,390 --> 00:38:59,119
were the first projects that had these

1002
00:39:04,390 --> 00:39:02,400
forums um but it soon became apparent

1003
00:39:06,150 --> 00:39:04,400
that the forums

1004
00:39:08,790 --> 00:39:06,160
kind of um

1005
00:39:10,390 --> 00:39:08,800
became victims of their own success

1006
00:39:12,069 --> 00:39:10,400
people were using them so much and so

1007
00:39:14,069 --> 00:39:12,079
many threads were being

1008
00:39:16,390 --> 00:39:14,079
created and people were having to go in

1009
00:39:17,430 --> 00:39:16,400
and reorganize threads and

1010
00:39:19,109 --> 00:39:17,440
um

1011
00:39:20,950 --> 00:39:19,119
we wanted to kind of create a system

1012
00:39:23,510 --> 00:39:20,960
where you could create collections of

1013
00:39:25,109 --> 00:39:23,520

interesting objects that you found so

1014
00:39:27,430 --> 00:39:25,119
that things that you favorite when

1015
00:39:30,150 --> 00:39:27,440
you're doing observations could then

1016
00:39:32,870 --> 00:39:30,160
make a collection that you could use and

1017
00:39:35,430 --> 00:39:32,880
potentially um

1018
00:39:37,589 --> 00:39:35,440
show share with other people um because

1019
00:39:39,750 --> 00:39:37,599
another kind of great example of a

1020
00:39:41,270 --> 00:39:39,760
serendipitous discovery were the green

1021
00:39:43,990 --> 00:39:41,280
pea galaxies

1022
00:39:46,710 --> 00:39:44,000
so this was a new type of ultra compact

1023
00:39:48,710 --> 00:39:46,720
galaxy that was discovered by volunteers

1024
00:39:50,710 --> 00:39:48,720
on the zoo universe on the galaxy zoo

1025
00:39:52,470 --> 00:39:50,720
forum who kind of said hey what are all

1026
00:39:53,750 --> 00:39:52,480
these little p things that we keep

1027
00:39:56,470 --> 00:39:53,760
seeing

1028
00:39:57,910 --> 00:39:56,480
and they made collections of them and we

1029
00:39:59,589 --> 00:39:57,920
realized that you know that's what

1030
00:40:01,349 --> 00:39:59,599
scientists do all the time they collect

1031
00:40:03,270 --> 00:40:01,359
together things that interest them you

1032
00:40:06,230 --> 00:40:03,280
know and that's a very kind of important

1033
00:40:07,750 --> 00:40:06,240
feature so we built this talk tool this

1034
00:40:09,750 --> 00:40:07,760
talk discussion tool that's attached to

1035
00:40:11,510 --> 00:40:09,760
all our projects now in an attempt to

1036
00:40:13,670 --> 00:40:11,520
kind of make it easier for people to

1037
00:40:15,589 --> 00:40:13,680
make collections of things and also to

1038
00:40:17,990 --> 00:40:15,599

have discussions around individual

1039
00:40:20,310 --> 00:40:18,000
objects so hey i found this thing it's

1040
00:40:21,430 --> 00:40:20,320
really cool anyone else seen it anyone

1041
00:40:23,270 --> 00:40:21,440
else got any thoughts about what it

1042
00:40:25,589 --> 00:40:23,280
might be or hey i've made this

1043
00:40:27,589 --> 00:40:25,599
collection of really cool things and now

1044
00:40:28,710 --> 00:40:27,599
i want to talk about them i know this i

1045
00:40:29,910 --> 00:40:28,720
think it's one of the most exciting

1046
00:40:30,790 --> 00:40:29,920
times to be

1047
00:40:31,910 --> 00:40:30,800
uh

1048
00:40:33,430 --> 00:40:31,920
not just i've always called this the

1049
00:40:35,349 --> 00:40:33,440
golden age of astronomy because of all

1050
00:40:36,390 --> 00:40:35,359
the really great telescopes and science

1051
00:40:38,870 --> 00:40:36,400
that's being done and discoveries that

1052
00:40:40,630 --> 00:40:38,880
are being made but the the this aspect

1053
00:40:42,390 --> 00:40:40,640
of it this of this ability for just you

1054
00:40:45,109 --> 00:40:42,400
know the the tools that are out there

1055
00:40:47,510 --> 00:40:45,119
for ordinary uh you know the regular

1056
00:40:48,870 --> 00:40:47,520
citizens to just who aren't do this who

1057
00:40:50,230 --> 00:40:48,880
love this stuff but don't get a chance

1058
00:40:52,230 --> 00:40:50,240
to do it every day or do it

1059
00:40:54,630 --> 00:40:52,240
professionally can contribute in a real

1060
00:40:56,950 --> 00:40:54,640
meaningful way so that's this is a very

1061
00:40:59,670 --> 00:40:56,960
exciting time so let's go back a little

1062
00:41:01,589 --> 00:40:59,680
let's go back to the um to the uh

1063
00:41:03,990 --> 00:41:01,599

website so is there anything else we

1064
00:41:06,870 --> 00:41:04,000
should be showing uh john or or mark do

1065
00:41:07,990 --> 00:41:06,880
you want me to think so uh

1066
00:41:10,390 --> 00:41:08,000
so there are all these great

1067
00:41:12,230 --> 00:41:10,400
serendipitous discoveries made at galaxy

1068
00:41:14,630 --> 00:41:12,240
zoo i just want to point out that with

1069
00:41:16,630 --> 00:41:14,640
this detective we guarantee you a

1070
00:41:20,309 --> 00:41:16,640
serendipitous discovery

1071
00:41:25,349 --> 00:41:22,950
if you don't get a make nobel prize

1072
00:41:27,990 --> 00:41:25,359
winning discovery with this detective i

1073
00:41:31,190 --> 00:41:28,000
will personally refund your money

1074
00:41:33,750 --> 00:41:31,200
wow that's that's amazing

1075
00:41:35,510 --> 00:41:33,760
so this one i'm looking at right now

1076
00:41:37,910 --> 00:41:35,520
this looks like an uh

1077
00:41:40,069 --> 00:41:37,920
a good candidate to me yeah

1078
00:41:42,710 --> 00:41:40,079
yeah it looks good go go back down yeah

1079
00:41:46,550 --> 00:41:42,720
yeah i i'd say that's good all right so

1080
00:41:46,560 --> 00:41:50,790
i i expect i expect my nobel prize

1081
00:41:55,190 --> 00:41:53,190
i'm printing it now okay you're pretty

1082
00:41:56,870 --> 00:41:55,200
good

1083
00:41:58,950 --> 00:41:56,880
okay so now i've got another one and i

1084
00:42:01,190 --> 00:41:58,960
noticed the finish the finish button

1085
00:42:02,710 --> 00:42:01,200
doesn't come up until i've gone all the

1086
00:42:05,190 --> 00:42:02,720
way through it

1087
00:42:06,950 --> 00:42:05,200
that's right so i can't i have to look

1088
00:42:08,790 --> 00:42:06,960

at every wavelength that you've got

1089
00:42:12,069 --> 00:42:08,800
every every image for this object that

1090
00:42:14,309 --> 00:42:12,079
you have before i can classify it yep

1091
00:42:16,790 --> 00:42:14,319
this one looks good too

1092
00:42:18,630 --> 00:42:16,800
yeah i would i'm so i'm gonna say good

1093
00:42:20,710 --> 00:42:18,640
candidate what are my choices here

1094
00:42:23,349 --> 00:42:20,720
multiple circles multiple objects in the

1095
00:42:25,510 --> 00:42:23,359
red circle extended beyond circle and

1096
00:42:28,470 --> 00:42:25,520
wise images not round

1097
00:42:30,790 --> 00:42:28,480
in bss or two mass

1098
00:42:32,550 --> 00:42:30,800
object moves off crosshairs

1099
00:42:34,230 --> 00:42:32,560
empty circle and wise images okay i

1100
00:42:36,950 --> 00:42:34,240
haven't seen any of that yet so i've

1101
00:42:40,950 --> 00:42:36,960
found all kinds of stuff already so

1102
00:42:43,829 --> 00:42:40,960
i'm like totally getting you guys there

1103
00:42:45,829 --> 00:42:43,839
this is another one so okay and and so

1104
00:42:46,950 --> 00:42:45,839
how come you guys don't require people

1105
00:42:49,990 --> 00:42:46,960
to

1106
00:42:52,390 --> 00:42:50,000
of this

1107
00:42:54,390 --> 00:42:52,400
anonymously is that on purpose

1108
00:42:56,150 --> 00:42:54,400
absolutely yeah we wanted to keep the

1109
00:42:58,550 --> 00:42:56,160
barrier to participation as low as

1110
00:43:00,230 --> 00:42:58,560
humanly possible so you know

1111
00:43:02,069 --> 00:43:00,240
ideally we'd like you to give us our

1112
00:43:03,990 --> 00:43:02,079
email so your email so we can tell you

1113
00:43:05,829 --> 00:43:04,000

about other projects that come up we can

1114
00:43:07,270 --> 00:43:05,839
give you feedback and access to the talk

1115
00:43:09,030 --> 00:43:07,280
discussion tool but

1116
00:43:10,470 --> 00:43:09,040
if you just want to come along and play

1117
00:43:11,430 --> 00:43:10,480
around we don't want to stop you from

1118
00:43:13,670 --> 00:43:11,440
doing that

1119
00:43:15,349 --> 00:43:13,680
are these um are these weighted in any

1120
00:43:17,750 --> 00:43:15,359
way so do you

1121
00:43:20,470 --> 00:43:17,760
like is like an anonymous person does

1122
00:43:22,150 --> 00:43:20,480
his or her classification mean less than

1123
00:43:24,390 --> 00:43:22,160
someone who isn't no

1124
00:43:26,470 --> 00:43:24,400
no absolutely not we um

1125
00:43:29,190 --> 00:43:26,480
we are able to kind of do some analysis

1126
00:43:31,190 --> 00:43:29,200
on uh the users who haven't logged in

1127
00:43:33,670 --> 00:43:31,200
because we know their ip addresses so we

1128
00:43:35,670 --> 00:43:33,680
know that they were there and we can

1129
00:43:38,390 --> 00:43:35,680
kind of find out which classifications

1130
00:43:40,870 --> 00:43:38,400
that they did so the um

1131
00:43:44,309 --> 00:43:40,880
the the value from unlogged in users is

1132
00:43:47,270 --> 00:43:44,319
as great as from logged in users okay so

1133
00:43:49,829 --> 00:43:47,280
none of that so uh john or mark what

1134
00:43:51,589 --> 00:43:49,839
what are you expecting in terms of um

1135
00:43:54,630 --> 00:43:51,599
turnout what do you hope how many

1136
00:43:55,910 --> 00:43:54,640
classifications do you need uh

1137
00:43:58,150 --> 00:43:55,920
for you to be able to get some

1138
00:43:59,589 --> 00:43:58,160

reasonable science done here

1139
00:44:01,750 --> 00:43:59,599
by the way we're going to be discarding

1140
00:44:03,589 --> 00:44:01,760
all of your classifications

1141
00:44:06,309 --> 00:44:03,599
oh nice why

1142
00:44:09,030 --> 00:44:06,319
because of the feedback oh i knew i was

1143
00:44:11,670 --> 00:44:09,040
going to pay for that

1144
00:44:13,109 --> 00:44:11,680
we'll never know it's you

1145
00:44:14,069 --> 00:44:13,119
know you're going to know you'd probably

1146
00:44:15,430 --> 00:44:14,079
get well

1147
00:44:16,550 --> 00:44:15,440
probably look from with the feedback

1148
00:44:17,349 --> 00:44:16,560
person i guess

1149
00:44:18,870 --> 00:44:17,359
but

1150
00:44:21,030 --> 00:44:18,880
yeah so uh

1151
00:44:24,150 --> 00:44:21,040
how many how many observations or

1152
00:44:26,630 --> 00:44:24,160
classifications do you need before um

1153
00:44:28,950 --> 00:44:26,640
you guys are ready to start looking at

1154
00:44:31,190 --> 00:44:28,960
writing some papers

1155
00:44:32,870 --> 00:44:31,200
we've got half a million objects in our

1156
00:44:33,990 --> 00:44:32,880
first list

1157
00:44:35,670 --> 00:44:34,000
that

1158
00:44:37,589 --> 00:44:35,680
we'd like

1159
00:44:39,030 --> 00:44:37,599
so you have a half million objects

1160
00:44:40,870 --> 00:44:39,040
presumably you want more than one

1161
00:44:42,069 --> 00:44:40,880
classification for each one so you're

1162
00:44:46,069 --> 00:44:42,079
looking into the millions of

1163
00:44:48,630 --> 00:44:47,750

right

1164
00:44:51,670 --> 00:44:48,640
okay

1165
00:44:53,990 --> 00:44:51,680
all right well uh i don't i hope i i can

1166
00:44:57,510 --> 00:44:54,000
i want to turn this space uh laura

1167
00:45:00,309 --> 00:44:57,520
correct me if i'm wrong uh

1168
00:45:05,750 --> 00:45:00,319
xenoverse project called space warts

1169
00:45:09,910 --> 00:45:06,870
whoop

1170
00:45:12,069 --> 00:45:09,920
you're muted i think you're muted

1171
00:45:14,710 --> 00:45:12,079
um i think space warps has had a little

1172
00:45:16,230 --> 00:45:14,720
over 8 million classifications

1173
00:45:17,990 --> 00:45:16,240
um so

1174
00:45:19,349 --> 00:45:18,000
and and then we shut the project down

1175
00:45:21,589 --> 00:45:19,359
because they didn't need any more than 8

1176
00:45:22,630 --> 00:45:21,599
million um they kind of got the results

1177
00:45:24,390 --> 00:45:22,640
they needed

1178
00:45:26,470 --> 00:45:24,400
and so i mean millions of

1179
00:45:29,349 --> 00:45:26,480
classifications is

1180
00:45:31,270 --> 00:45:29,359
is not unusual for our projects

1181
00:45:33,270 --> 00:45:31,280
we're we're lucky that people are

1182
00:45:35,109 --> 00:45:33,280
interested in this time

1183
00:45:35,910 --> 00:45:35,119
yeah we really are

1184
00:45:37,670 --> 00:45:35,920
well

1185
00:45:39,510 --> 00:45:37,680
we couldn't do it without them uh yeah

1186
00:45:41,589 --> 00:45:39,520
we we really are lucky in terms of the

1187
00:45:43,990 --> 00:45:41,599
field we work in it's so easy to get the

1188
00:45:45,670 --> 00:45:44,000

public engaged because it you know this

1189
00:45:48,069 --> 00:45:45,680
this subject matter just comes naturally

1190
00:45:50,390 --> 00:45:48,079
to us whether it's you know uh

1191
00:45:52,790 --> 00:45:50,400
exoplanets or very distant galaxies high

1192
00:45:53,990 --> 00:45:52,800
red shift galaxies protoplanetary disk

1193
00:45:56,150 --> 00:45:54,000
debris dis like what you guys are

1194
00:45:58,230 --> 00:45:56,160
talking about anything it's just the

1195
00:46:00,150 --> 00:45:58,240
idea that we're able to look at other

1196
00:46:02,069 --> 00:46:00,160
stars within our galaxy and do things

1197
00:46:05,030 --> 00:46:02,079
that we haven't ever been able to really

1198
00:46:07,750 --> 00:46:05,040
do before and learn so much it's easy to

1199
00:46:10,069 --> 00:46:07,760
get people engaged it really uh is

1200
00:46:11,750 --> 00:46:10,079
amazing uh that we're lucky to be part

1201
00:46:14,230 --> 00:46:11,760
of a uh

1202
00:46:16,790 --> 00:46:14,240
a field of study where that's the case

1203
00:46:19,030 --> 00:46:16,800
uh hans milling from uh youtube is

1204
00:46:20,950 --> 00:46:19,040
saying that the spotter's guide does not

1205
00:46:22,550 --> 00:46:20,960
work in google chrome no videos are

1206
00:46:25,190 --> 00:46:22,560
shown just the play button and

1207
00:46:29,190 --> 00:46:25,200
descriptions so i thought i'd point that

1208
00:46:30,309 --> 00:46:29,200
out um that that's one thank you hans

1209
00:46:34,790 --> 00:46:30,319
yeah

1210
00:46:37,109 --> 00:46:34,800
so i'll definitely look at that um

1211
00:46:38,150 --> 00:46:37,119
uh is there any um

1212
00:46:40,069 --> 00:46:38,160
ian do you have any other questions

1213
00:46:42,870 --> 00:46:40,079

you'd like to ask yeah i just have one

1214
00:46:44,710 --> 00:46:42,880
question and i don't know if if this is

1215
00:46:46,550 --> 00:46:44,720
a possibility but because of course the

1216
00:46:48,950 --> 00:46:46,560
other xenoverse project uh planet

1217
00:46:51,109 --> 00:46:48,960
hunters um is there any plans to do a

1218
00:46:51,910 --> 00:46:51,119
crossover with disc hunters because you

1219
00:46:53,510 --> 00:46:51,920
know

1220
00:46:55,270 --> 00:46:53,520
there's there's kind of a natural

1221
00:46:56,710 --> 00:46:55,280
organic relationship there i'm just

1222
00:46:59,270 --> 00:46:56,720
wondering if you can

1223
00:47:01,349 --> 00:46:59,280
you know pick out canada stars and

1224
00:47:04,790 --> 00:47:01,359
relate them to a planetary search as

1225
00:47:06,069 --> 00:47:04,800
well as the disc hunting search

1226
00:47:07,030 --> 00:47:06,079
ian yes

1227
00:47:07,829 --> 00:47:07,040
um

1228
00:47:10,950 --> 00:47:07,839
the

1229
00:47:13,109 --> 00:47:10,960
planet hunters as it exists now

1230
00:47:15,589 --> 00:47:13,119
is about studying stars that were

1231
00:47:18,710 --> 00:47:15,599
observed with kepler

1232
00:47:20,390 --> 00:47:18,720
and the templar field overlaps with

1233
00:47:21,829 --> 00:47:20,400
the whole sky of course and we're

1234
00:47:23,349 --> 00:47:21,839
studying the whole sky so yes we'll be

1235
00:47:25,510 --> 00:47:23,359
studying that whole field

1236
00:47:26,950 --> 00:47:25,520
cool um wait that was the good news the

1237
00:47:28,150 --> 00:47:26,960
bad news is that other people have

1238
00:47:30,069 --> 00:47:28,160

already done it

1239
00:47:31,190 --> 00:47:30,079
to some degree this kepler field has

1240
00:47:33,270 --> 00:47:31,200
been been

1241
00:47:35,430 --> 00:47:33,280
studied to death really

1242
00:47:38,790 --> 00:47:35,440
by astronomers so i'm not sure we'll

1243
00:47:41,910 --> 00:47:38,800
have anything new to add

1244
00:47:43,589 --> 00:47:41,920
for this version with plano hunters

1245
00:47:45,910 --> 00:47:43,599
future versions of planet hunters i

1246
00:47:46,870 --> 00:47:45,920
think are going to involve other data

1247
00:47:47,990 --> 00:47:46,880
sets

1248
00:47:49,750 --> 00:47:48,000
and

1249
00:47:51,510 --> 00:47:49,760
we're going to know about degree discs

1250
00:47:54,309 --> 00:47:51,520
and photo planetary disks everywhere in

1251
00:47:58,470 --> 00:47:54,319
the sky so whatever other data they have

1252
00:48:04,390 --> 00:48:01,750
yeah one thing i'll add is that if so

1253
00:48:06,470 --> 00:48:04,400
right now kepler is its future is a

1254
00:48:08,309 --> 00:48:06,480
little uncertain because it lost all of

1255
00:48:09,270 --> 00:48:08,319
its reaction wheels and it can't do the

1256
00:48:11,589 --> 00:48:09,280
kind of

1257
00:48:14,150 --> 00:48:11,599
precise uh science that it was doing

1258
00:48:16,790 --> 00:48:14,160
before but the kepler team is actually

1259
00:48:18,790 --> 00:48:16,800
proposing for a an extension to the

1260
00:48:20,710 --> 00:48:18,800
mission that's slightly different where

1261
00:48:22,950 --> 00:48:20,720
it'll be slowly

1262
00:48:25,510 --> 00:48:22,960
you know it'll be checking some fields

1263
00:48:26,710 --> 00:48:25,520

that are along the solar system ecliptic

1264
00:48:27,990 --> 00:48:26,720
because they've come up with this

1265
00:48:31,030 --> 00:48:28,000
brilliant way

1266
00:48:33,589 --> 00:48:31,040
of still getting really good photometry

1267
00:48:35,750 --> 00:48:33,599
by i think aligning to the sun's

1268
00:48:36,870 --> 00:48:35,760
magnetic field or the solar wind or

1269
00:48:39,190 --> 00:48:36,880
something like that i don't know the

1270
00:48:41,430 --> 00:48:39,200
details but it it's a really great idea

1271
00:48:44,309 --> 00:48:41,440
so i could imagine a time

1272
00:48:47,190 --> 00:48:44,319
where if that mission goes ahead they'll

1273
00:48:48,870 --> 00:48:47,200
have all this great kepler style data

1274
00:48:51,270 --> 00:48:48,880
for different patches of sky and

1275
00:48:52,630 --> 00:48:51,280
hopefully by then disk detective will

1276
00:48:55,430 --> 00:48:52,640
have told them

1277
00:48:56,950 --> 00:48:55,440
where all the cool debris disks are and

1278
00:48:57,910 --> 00:48:56,960
maybe there will be some

1279
00:49:00,069 --> 00:48:57,920
way to

1280
00:49:02,549 --> 00:49:00,079
to overlap those two

1281
00:49:03,349 --> 00:49:02,559
projects together in an interesting way

1282
00:49:05,430 --> 00:49:03,359
so

1283
00:49:07,750 --> 00:49:05,440
we'll see

1284
00:49:09,750 --> 00:49:07,760
no promises i won't i won't give you

1285
00:49:11,349 --> 00:49:09,760
your money back if it doesn't happen but

1286
00:49:13,510 --> 00:49:11,359
uh

1287
00:49:15,270 --> 00:49:13,520
if nothing else i'm totally gonna see

1288
00:49:17,030 --> 00:49:15,280

about planning some kind of outreach

1289
00:49:18,309 --> 00:49:17,040
session here at the adler using both

1290
00:49:19,270 --> 00:49:18,319
projects

1291
00:49:20,150 --> 00:49:19,280
great

1292
00:49:23,750 --> 00:49:20,160
yeah

1293
00:49:25,829 --> 00:49:23,760
so so uh the adler is um uh i haven't i

1294
00:49:27,510 --> 00:49:25,839
haven't been to the adler in years and

1295
00:49:28,950 --> 00:49:27,520
uh do you guys have it what what are

1296
00:49:30,630 --> 00:49:28,960
some of the outreach things you guys do

1297
00:49:33,109 --> 00:49:30,640
there

1298
00:49:35,990 --> 00:49:33,119
so we we have a nice field trip program

1299
00:49:38,230 --> 00:49:36,000
that we run here that uses um

1300
00:49:40,710 --> 00:49:38,240
we have oraries to kind of demonstrate

1301
00:49:43,109 --> 00:49:40,720
to kids the the transit methods so that

1302
00:49:45,510 --> 00:49:43,119
they can go away and use planet hunters

1303
00:49:47,670 --> 00:49:45,520
we're also working to kind of get more

1304
00:49:50,309 --> 00:49:47,680
of our projects embedded on the new on

1305
00:49:52,230 --> 00:49:50,319
the museum floor uh we're we're hoping

1306
00:49:53,829 --> 00:49:52,240
not to just we we think that this

1307
00:49:55,829 --> 00:49:53,839
universe is a great thing for people to

1308
00:49:57,589 --> 00:49:55,839
take home and do we want to kind of have

1309
00:49:59,750 --> 00:49:57,599
value-added experiences here at the

1310
00:50:01,670 --> 00:49:59,760
adler so something that helps you better

1311
00:50:03,510 --> 00:50:01,680
understand the science behind projects

1312
00:50:05,589 --> 00:50:03,520
that you can then go home and do the

1313
00:50:08,230 --> 00:50:05,599

projects when you get there

1314
00:50:09,670 --> 00:50:08,240
great okay yeah i remember i i the last

1315
00:50:13,510 --> 00:50:09,680
time i was at theater i think was in the

1316
00:50:16,549 --> 00:50:15,349
the planetary it was a planetarium

1317
00:50:17,990 --> 00:50:16,559
society meeting anyway it was a

1318
00:50:18,790 --> 00:50:18,000
beautiful place up there really enjoyed

1319
00:50:20,150 --> 00:50:18,800
it

1320
00:50:23,190 --> 00:50:20,160
we have we have the best view in the

1321
00:50:25,670 --> 00:50:23,200
city here yes definitely okay so the

1322
00:50:27,750 --> 00:50:25,680
website is diskdetectives.org it is a

1323
00:50:30,790 --> 00:50:27,760
new uh citizen science initiative from

1324
00:50:32,390 --> 00:50:30,800
the xenoverse family of citizen science

1325
00:50:34,069 --> 00:50:32,400
things out the last one of the last

1326
00:50:37,510 --> 00:50:34,079
hangout helpful hangouts we did was on

1327
00:50:38,470 --> 00:50:37,520
the m83 uh project that brad whitmore

1328
00:50:40,630 --> 00:50:38,480
has done

1329
00:50:43,030 --> 00:50:40,640
so i would encourage you guys to go

1330
00:50:45,430 --> 00:50:43,040
there and start classifying you saw how

1331
00:50:47,349 --> 00:50:45,440
easy if i can do it then anybody can do

1332
00:50:48,870 --> 00:50:47,359
it because as we can see i can't seem to

1333
00:50:50,950 --> 00:50:48,880
run a hangout without there being some

1334
00:50:52,630 --> 00:50:50,960
technical issues but that this was a

1335
00:50:54,790 --> 00:50:52,640
very easy website to use so i encourage

1336
00:50:56,710 --> 00:50:54,800
you guys to go and give it a shot you

1337
00:51:00,069 --> 00:50:56,720
can follow them at

1338
00:51:01,349 --> 00:51:00,079

disc underscore detective on twitter

1339
00:51:02,790 --> 00:51:01,359
is there anything else you want to you

1340
00:51:05,109 --> 00:51:02,800
want to shout out any other social

1341
00:51:07,349 --> 00:51:05,119
things you have a facebook page we have

1342
00:51:09,589 --> 00:51:07,359
a facebook page yep

1343
00:51:11,349 --> 00:51:09,599
is it facebook dot com slash dis

1344
00:51:12,309 --> 00:51:11,359
detective

1345
00:51:13,990 --> 00:51:12,319
uh

1346
00:51:16,390 --> 00:51:14,000
does i i don't know

1347
00:51:18,710 --> 00:51:16,400
okay i think i will play

1348
00:51:20,069 --> 00:51:18,720
detective yeah i will post a link to

1349
00:51:22,630 --> 00:51:20,079
that in the event and the description

1350
00:51:25,030 --> 00:51:22,640
box on the youtube video uh thank you

1351
00:51:27,349 --> 00:51:25,040
guys for uh joining me i want to thank

1352
00:51:29,270 --> 00:51:27,359
ian thank you for for for helping me and

1353
00:51:31,349 --> 00:51:29,280
uh and contributing i really appreciate

1354
00:51:33,270 --> 00:51:31,359
it uh dr john devis from the space

1355
00:51:34,630 --> 00:51:33,280
telescope science institute thank you so

1356
00:51:36,309 --> 00:51:34,640
much thank you

1357
00:51:39,750 --> 00:51:36,319
dr laura white thank you also for the

1358
00:51:41,910 --> 00:51:39,760
zuniverse and dr mark kushner from uh

1359
00:51:43,349 --> 00:51:41,920
goddard all of these guys have done some

1360
00:51:45,750 --> 00:51:43,359
great work and we hope that you will

1361
00:51:48,549 --> 00:51:45,760
help them out and uh and start doing

1362
00:51:50,230 --> 00:51:48,559
some classifications on debris disks for

1363
00:51:51,109 --> 00:51:50,240

them it's a very interesting idea and a

1364
00:51:53,349 --> 00:51:51,119
really

1365
00:51:55,910 --> 00:51:53,359
i think a good opportunity for all of

1366
00:51:57,750 --> 00:51:55,920
you guys to uh to get involved i want to

1367
00:51:59,990 --> 00:51:57,760
apologize for the the some of the uh

1368
00:52:02,069 --> 00:52:00,000
technical issues we had this time around

1369
00:52:03,910 --> 00:52:02,079
i will uh uh

1370
00:52:05,589 --> 00:52:03,920
correct some of that in the editing

1371
00:52:08,470 --> 00:52:05,599
after the fact but i think it just

1372
00:52:10,549 --> 00:52:08,480
enriches the hangar experience

1373
00:52:12,150 --> 00:52:10,559
you know that makes it more authentic

1374
00:52:13,510 --> 00:52:12,160
fingernails on the chalkboard with that

1375
00:52:15,109 --> 00:52:13,520
feedback here

1376
00:52:17,270 --> 00:52:15,119
anyway thank you all for your patience