

1
00:00:00,170 --> 00:00:07,609
so thank you very much for coming for

2
00:00:02,970 --> 00:00:07,609
the Hubble Space Telescope Town Hall

3
00:00:07,910 --> 00:00:12,179
you're here to the bitter end and we're

4
00:00:10,289 --> 00:00:15,419
glad to have you here

5
00:00:12,179 --> 00:00:16,769
we're very we're very excited and I

6
00:00:15,419 --> 00:00:18,839
think the whole community should be

7
00:00:16,769 --> 00:00:21,989
excited that this marvellous telescope

8
00:00:18,839 --> 00:00:25,800
has lasted through to this year and this

9
00:00:21,989 --> 00:00:29,368
begins the 25th year of Hubble Space

10
00:00:25,800 --> 00:00:31,949
Telescope operations who knew it's done

11
00:00:29,368 --> 00:00:33,899
an amazing amount of science it's really

12
00:00:31,949 --> 00:00:35,850
transformed a lot of the way we do

13
00:00:33,899 --> 00:00:39,989
science as well as our thinking on many

14
00:00:35,850 --> 00:00:42,510
topics and so today as part of the

15
00:00:39,988 --> 00:00:44,909
anniversary here at the kick-off

16
00:00:42,509 --> 00:00:47,878
proceedings at the double-a s we started

17
00:00:44,909 --> 00:00:50,939
with some great press releases

18
00:00:47,878 --> 00:00:53,729
beautifully beautiful imagery and now

19
00:00:50,939 --> 00:00:57,329
with the Town Hall which is being

20
00:00:53,729 --> 00:01:00,929
recorded for posterity and also if you

21
00:00:57,329 --> 00:01:03,480
like to share with your friends that we

22
00:01:00,929 --> 00:01:05,489
did record this and we will put it on

23
00:01:03,479 --> 00:01:07,798
YouTube so it can be viewed later by

24
00:01:05,489 --> 00:01:10,859
those who were not fortunate enough to

25
00:01:07,799 --> 00:01:14,159
be here in this town hall we're going to

26
00:01:10,859 --> 00:01:17,789
have three speakers first can Sam Bach

27
00:01:14,159 --> 00:01:21,330
from Space Telescope who is the Hubble

28
00:01:17,790 --> 00:01:23,759
Space Telescope mission had that and

29

00:01:21,329 --> 00:01:26,819
he's going to review a little bit about

30
00:01:23,759 --> 00:01:30,719
where we are with HST and it's bright

31
00:01:26,819 --> 00:01:33,239
future then we're going to have Jennifer

32
00:01:30,719 --> 00:01:35,670
lots who's from Space Telescope who's

33
00:01:33,239 --> 00:01:39,599
going to talk to us about our major

34
00:01:35,670 --> 00:01:42,990
effort of large observation for the

35
00:01:39,599 --> 00:01:45,839
frontier fields and she's the PI of that

36
00:01:42,989 --> 00:01:48,179
program and some really beautiful data

37
00:01:45,840 --> 00:01:52,590
and fantastic results have come out of

38
00:01:48,180 --> 00:01:55,290
that program and then amber straw from

39
00:01:52,590 --> 00:01:57,630
NASA headquarters is going to talk to

40
00:01:55,290 --> 00:02:00,659
you about the 25th anniversary

41
00:01:57,629 --> 00:02:03,868
celebration the year of activities that

42
00:02:00,659 --> 00:02:06,299
are ongoing and how you can participate

43
00:02:03,868 --> 00:02:08,250

and I will let each speaker handoff to

44

00:02:06,299 --> 00:02:11,510

the next and then at the end we will

45

00:02:08,250 --> 00:02:13,030

have ample time for your questions and

46

00:02:11,509 --> 00:02:15,009

discussion

47

00:02:13,030 --> 00:02:22,030

thank you so first off we'll be ken-san

48

00:02:15,009 --> 00:02:26,769

Bach on what about HST today and Thank

49

00:02:22,030 --> 00:02:27,818

You Carol so yeah today I'm going to

50

00:02:26,770 --> 00:02:29,530

tell you a little bit about where we

51

00:02:27,818 --> 00:02:31,479

stand with the observatory today and

52

00:02:29,530 --> 00:02:34,449

where we're heading and heading in the

53

00:02:31,479 --> 00:02:37,238

next few years and punchline is this

54

00:02:34,449 --> 00:02:38,318

Hubble is just doing beautifully it's as

55

00:02:37,239 --> 00:02:41,080

powerful as ever

56

00:02:38,318 --> 00:02:44,379

we have excellent imaging and

57

00:02:41,080 --> 00:02:46,719

spectroscopy capabilities we're still

58
00:02:44,379 --> 00:02:49,209
doing choreography and Strama tree with

59
00:02:46,719 --> 00:02:53,349
the telescope and the observing program

60
00:02:49,209 --> 00:02:54,909
is addressing everything from exoplanet

61
00:02:53,349 --> 00:02:58,060
science to the architecture of the

62
00:02:54,909 --> 00:03:00,549
universe the science that Hubble does

63
00:02:58,060 --> 00:03:03,759
cuts across NASA's main science themes

64
00:03:00,550 --> 00:03:07,209
and as always Hubble remains a great

65
00:03:03,759 --> 00:03:10,719
Observatory multi-purpose and in my

66
00:03:07,209 --> 00:03:12,640
demand by the observing community you

67
00:03:10,719 --> 00:03:15,609
probably saw this beautiful image on

68
00:03:12,639 --> 00:03:17,679
Monday when it was released this

69
00:03:15,610 --> 00:03:20,799
original image of the Eagle Nebula was

70
00:03:17,680 --> 00:03:24,519
taken 20 years ago now our Wide Field

71
00:03:20,799 --> 00:03:27,310
Camera 3 has reimaged that field both at

72
00:03:24,519 --> 00:03:30,519
visible and at near-infrared wavelengths

73
00:03:27,310 --> 00:03:33,610
and you can see how remarkable that

74
00:03:30,519 --> 00:03:36,280
field looks both in the visible with a

75
00:03:33,610 --> 00:03:39,100
wider field of view and in the infrared

76
00:03:36,280 --> 00:03:42,669
where you can see deep into some of

77
00:03:39,099 --> 00:03:44,349
these pillars of star formation many of

78
00:03:42,669 --> 00:03:47,768
you have probably also seen the

79
00:03:44,349 --> 00:03:52,750
tremendous m31 mosaic that's outside the

80
00:03:47,769 --> 00:03:55,719
other hall that we have conference talks

81
00:03:52,750 --> 00:03:57,759
in that image is the largest image ever

82
00:03:55,719 --> 00:04:01,449
produced by the observatory both

83
00:03:57,759 --> 00:04:03,250
physically printed by the observatory as

84
00:04:01,449 --> 00:04:04,899
well as the largest mosaic we've ever

85
00:04:03,250 --> 00:04:07,269
made on the sky and that was done by

86

00:04:04,900 --> 00:04:08,739
julian del canton and heard folks here

87
00:04:07,269 --> 00:04:10,599
at the university of washington so it

88
00:04:08,739 --> 00:04:14,680
was very fitting that we were able to

89
00:04:10,599 --> 00:04:16,298
bring that mosaic here to Seattle take a

90
00:04:14,680 --> 00:04:18,639
look at that get your nose up close to

91
00:04:16,298 --> 00:04:21,629
that particular image 100 million stars

92
00:04:18,639 --> 00:04:24,279
and that image resolved it's amazing

93
00:04:21,629 --> 00:04:26,069
hobo science output continues to be

94
00:04:24,279 --> 00:04:28,229
extremely good

95
00:04:26,069 --> 00:04:30,480
past year was another excellent year

96
00:04:28,230 --> 00:04:33,600
with more than 800 papers published

97
00:04:30,480 --> 00:04:35,759
based on HST data we're running right

98
00:04:33,600 --> 00:04:38,400
around 800 papers a year or so for the

99
00:04:35,759 --> 00:04:40,920
last four or five years there have now

100
00:04:38,399 --> 00:04:44,459

been almost 13,000 papers published to

101

00:04:40,920 --> 00:04:46,980

date based on HST data and an even more

102

00:04:44,459 --> 00:04:50,219

remarkable number is that almost 13,000

103

00:04:46,980 --> 00:04:54,000

700 different people have published or

104

00:04:50,220 --> 00:04:55,710

had their names on HST papers think

105

00:04:54,000 --> 00:04:57,839

about that for a minute that's that's

106

00:04:55,709 --> 00:05:00,299

bigger than the size of the SS for sure

107

00:04:57,839 --> 00:05:02,209

and so you know Hubble is definitely

108

00:05:00,300 --> 00:05:05,189

touching generations of astronomers

109

00:05:02,209 --> 00:05:07,229

there have been more than 500 PhD theses

110

00:05:05,189 --> 00:05:09,649

based on Hubble data and right now

111

00:05:07,230 --> 00:05:13,950

approximately 40 or 50 people a year

112

00:05:09,649 --> 00:05:18,269

have PhD theses published that are based

113

00:05:13,949 --> 00:05:20,729

on Hubble data overall the observatory

114

00:05:18,269 --> 00:05:22,319

is doing extremely well the science

115
00:05:20,730 --> 00:05:24,629
instruments are all healthy and

116
00:05:22,319 --> 00:05:26,819
operating the advanced camera for

117
00:05:24,629 --> 00:05:29,519
surveys is and the Wide Field Camera 3

118
00:05:26,819 --> 00:05:32,399
both have charge transfer Corrections in

119
00:05:29,519 --> 00:05:33,750
place for their CCD cameras which is

120
00:05:32,399 --> 00:05:36,060
great because it means that we're

121
00:05:33,750 --> 00:05:39,149
actually able to rollback the aging

122
00:05:36,060 --> 00:05:41,819
clocks a bit on those cameras the cosmic

123
00:05:39,149 --> 00:05:45,209
origins spectrograph sensitivity is

124
00:05:41,819 --> 00:05:47,040
still very very good we now have very

125
00:05:45,209 --> 00:05:50,489
blue modes that get down well below

126
00:05:47,040 --> 00:05:52,110
lyman-alpha the Space Telescope imaging

127
00:05:50,490 --> 00:05:53,340
spectrograph is operating well and as I

128
00:05:52,110 --> 00:05:56,100
said before it's being used for

129
00:05:53,339 --> 00:05:58,560
choreography as well as spectroscopy and

130
00:05:56,100 --> 00:06:00,890
imaging on the main systems of the

131
00:05:58,560 --> 00:06:03,780
observatory those are also working well

132
00:06:00,889 --> 00:06:05,849
five of the six gyros are available for

133
00:06:03,779 --> 00:06:09,059
use we lost one gyro back in March of

134
00:06:05,850 --> 00:06:10,560
last year not a surprise gyros are not a

135
00:06:09,060 --> 00:06:12,209
life limiting factor for this

136
00:06:10,560 --> 00:06:16,160
Observatory we know how to run in a

137
00:06:12,209 --> 00:06:16,159
reduced gyro mode should it be necessary

138
00:06:16,350 --> 00:06:20,760
overall the thermal control the data

139
00:06:18,449 --> 00:06:24,769
management systems and so on are all in

140
00:06:20,759 --> 00:06:27,000
excellent health one interesting tidbit

141
00:06:24,769 --> 00:06:28,859
two instruments were repaired during

142
00:06:27,000 --> 00:06:31,050
servicing mission five and a half years

143

00:06:28,860 --> 00:06:33,590
ago that advanced camera for surveys and

144
00:06:31,050 --> 00:06:36,480
Space Telescope imaging spectrograph

145
00:06:33,589 --> 00:06:39,448
those failures that originally occurred

146
00:06:36,480 --> 00:06:41,699
were electronic in nature the

147
00:06:39,449 --> 00:06:45,360
astronauts installed new electronics in

148
00:06:41,699 --> 00:06:47,699
both instruments those two new

149
00:06:45,360 --> 00:06:49,528
instruments have run now on those newly

150
00:06:47,699 --> 00:06:52,650
installed electronics longer than they

151
00:06:49,528 --> 00:06:54,389
ran on the original electronics that's

152
00:06:52,649 --> 00:06:56,668
very encouraging because it suggests

153
00:06:54,389 --> 00:06:59,218
that the instruments have outlived their

154
00:06:56,668 --> 00:07:01,288
infant mortality period so it's quite

155
00:06:59,218 --> 00:07:02,939
possible even though we originally

156
00:07:01,288 --> 00:07:04,709
thought those two instruments might not

157
00:07:02,939 --> 00:07:06,360

last more than five years they may

158

00:07:04,709 --> 00:07:11,038

actually last considerably longer than

159

00:07:06,360 --> 00:07:12,870

that we'll see in looking forward the

160

00:07:11,038 --> 00:07:15,028

mission has put together what it calls a

161

00:07:12,870 --> 00:07:16,949

20/20 vision for the observatory and

162

00:07:15,028 --> 00:07:19,348

that 20/20 vision is very

163

00:07:16,949 --> 00:07:22,468

straightforward and simple is to operate

164

00:07:19,348 --> 00:07:23,819

the observatory out to 2020 or beyond so

165

00:07:22,468 --> 00:07:26,370

that there's at least a year of

166

00:07:23,819 --> 00:07:29,218

overlapping science observations with

167

00:07:26,370 --> 00:07:30,810

JWST and that's going to be performed in

168

00:07:29,218 --> 00:07:33,240

a manner that maximizes the science

169

00:07:30,810 --> 00:07:36,838

return of both observatories takes full

170

00:07:33,240 --> 00:07:39,379

advantages of HST unique capabilities

171

00:07:36,838 --> 00:07:42,300

and really addresses the community's

172
00:07:39,379 --> 00:07:45,569
scientific curiosity and engages the

173
00:07:42,300 --> 00:07:47,879
public in scientific discovery let's

174
00:07:45,569 --> 00:07:49,499
think about that for a minute if we

175
00:07:47,879 --> 00:07:52,468
operate out through the end of fiscal

176
00:07:49,499 --> 00:07:54,838
year twenty one which is cycle 28 we're

177
00:07:52,468 --> 00:07:58,168
currently in cycle 22 right now that's

178
00:07:54,838 --> 00:08:00,860
about seven cycles of observations at

179
00:07:58,168 --> 00:08:03,598
about 4,000 science orbits per cycle

180
00:08:00,860 --> 00:08:06,060
4,000 hours per cycle roughly that's

181
00:08:03,598 --> 00:08:08,399
28,000 orbits of science remaining and

182
00:08:06,060 --> 00:08:12,269
for comparison we typically have about

183
00:08:08,399 --> 00:08:15,120
20,000 hours or orbits requested each

184
00:08:12,269 --> 00:08:16,769
cycle there's clearly no loss of things

185
00:08:15,120 --> 00:08:18,689
or lack of things to do with this

186
00:08:16,769 --> 00:08:21,538
Observatory in its remaining years the

187
00:08:18,689 --> 00:08:24,569
question is what do we do and so we've

188
00:08:21,538 --> 00:08:29,088
put out a call for HST 2020 as an extra

189
00:08:24,569 --> 00:08:29,088
two in there isn't there you never know

190
00:08:29,310 --> 00:08:34,169
you never know we put out a call for

191
00:08:32,129 --> 00:08:36,899
vision white paper short white papers

192
00:08:34,169 --> 00:08:38,189
from the community just asking what is

193
00:08:36,899 --> 00:08:39,750
it that we should be doing with the

194
00:08:38,190 --> 00:08:41,670
observatory over the next five or six

195
00:08:39,750 --> 00:08:45,120
years that would enhance the scientific

196
00:08:41,669 --> 00:08:48,029
legacy those are due February 20th and

197
00:08:45,120 --> 00:08:50,009
the submission details are there those

198
00:08:48,029 --> 00:08:51,779
papers can address any aspect of a

199
00:08:50,009 --> 00:08:54,419
Hubble program so I'll put forward a

200

00:08:51,779 --> 00:08:55,980
couple of questions to you are there

201
00:08:54,419 --> 00:08:58,529
specific programs we should be

202
00:08:55,980 --> 00:08:59,940
undertaking now in preparation for JWST

203
00:08:58,529 --> 00:09:02,789
or during the period of overlapping

204
00:08:59,940 --> 00:09:04,140
observations what types of synergies

205
00:09:02,789 --> 00:09:05,120
might be available we'd like to hear

206
00:09:04,139 --> 00:09:07,830
your thoughts on that

207
00:09:05,120 --> 00:09:10,320
are there other observations from ground

208
00:09:07,830 --> 00:09:11,910
or space-based observatories that should

209
00:09:10,320 --> 00:09:13,710
be more closely linked to HST

210
00:09:11,909 --> 00:09:15,240
observations over the next few years

211
00:09:13,710 --> 00:09:17,190
should we have some kind of a reciprocal

212
00:09:15,240 --> 00:09:21,600
observing agreement like we do with nao

213
00:09:17,190 --> 00:09:22,980
nao or NRAO for example are there

214
00:09:21,600 --> 00:09:24,690

science questions that should receive

215

00:09:22,980 --> 00:09:26,490

greater emphasis over the next five

216

00:09:24,690 --> 00:09:28,140

years that's kind of a loaded question

217

00:09:26,490 --> 00:09:31,379

but we'd like to hear your thoughts on

218

00:09:28,139 --> 00:09:35,100

that and of course your rationale for

219

00:09:31,379 --> 00:09:37,200

why that should be should we devote a

220

00:09:35,100 --> 00:09:41,220

greater proportion of observing time to

221

00:09:37,200 --> 00:09:43,020

specific purposes and one that I

222

00:09:41,220 --> 00:09:45,540

mentioned earlier should we be putting

223

00:09:43,019 --> 00:09:47,460

more emphasis on making sure that

224

00:09:45,539 --> 00:09:49,799

students can finish their PhDs or use

225

00:09:47,460 --> 00:09:51,000

Hubble for their PhD thesis I think

226

00:09:49,799 --> 00:09:53,729

that's a great question to ask the

227

00:09:51,000 --> 00:09:55,529

community should we make a special

228

00:09:53,730 --> 00:09:57,450

effort to optimize the observing

229
00:09:55,529 --> 00:10:00,629
programme for transient phenomena in the

230
00:09:57,450 --> 00:10:04,530
area of pan-starrs LSST transient

231
00:10:00,629 --> 00:10:05,909
phenomena are going to be leading to all

232
00:10:04,529 --> 00:10:09,389
kinds of discoveries should we be doing

233
00:10:05,909 --> 00:10:10,740
something with Hubble to optimize their

234
00:10:09,389 --> 00:10:13,199
science return from those kinds of

235
00:10:10,740 --> 00:10:15,779
observations and given that Hubble's

236
00:10:13,200 --> 00:10:17,580
feet lifetime is finite are there

237
00:10:15,779 --> 00:10:19,769
changes the time allocation committee

238
00:10:17,580 --> 00:10:22,680
that maybe we should make not that it

239
00:10:19,769 --> 00:10:24,149
needs to be made it runs well but maybe

240
00:10:22,679 --> 00:10:25,739
there's something that we could do to

241
00:10:24,149 --> 00:10:27,179
enable quicker responses to new

242
00:10:25,740 --> 00:10:31,649
discoveries is there something that we

243
00:10:27,179 --> 00:10:34,199
should be doing let us know so we have a

244
00:10:31,649 --> 00:10:37,220
call for proposals out now that was

245
00:10:34,200 --> 00:10:41,460
released yesterday the proposals are due

246
00:10:37,220 --> 00:10:43,290
April 10th there are key features remain

247
00:10:41,460 --> 00:10:45,089
from previous

248
00:10:43,289 --> 00:10:47,610
so the ultraviolet observing initiative

249
00:10:45,089 --> 00:10:49,950
continues the medium proposal category

250
00:10:47,610 --> 00:10:51,240
continues the frontier fields which

251
00:10:49,950 --> 00:10:53,759
you'll hear about in just a moment from

252
00:10:51,240 --> 00:10:55,680
Jennifer continue and we encourage

253
00:10:53,759 --> 00:10:58,169
people to submit archival in theory in

254
00:10:55,679 --> 00:10:59,639
general observer proposals specifically

255
00:10:58,169 --> 00:11:02,969
that develops not the scientific

256
00:10:59,639 --> 00:11:05,389
landscape for JWST and help maximize its

257

00:11:02,970 --> 00:11:07,860
scientific return or can exploit

258
00:11:05,389 --> 00:11:11,009
potential of those frontier field

259
00:11:07,860 --> 00:11:12,600
programs we'll be talking with the

260
00:11:11,009 --> 00:11:15,230
community some more about this at our

261
00:11:12,600 --> 00:11:18,990
May symposium at the Institute in April

262
00:11:15,230 --> 00:11:21,300
that's the symposium devoted to looking

263
00:11:18,990 --> 00:11:24,028
not only back at the extraordinary

264
00:11:21,299 --> 00:11:26,549
impact that Hubble has had on science

265
00:11:24,028 --> 00:11:29,458
culture and society but also looking at

266
00:11:26,549 --> 00:11:32,338
how we can craft a real scientific

267
00:11:29,458 --> 00:11:33,569
legacy for the mission and to focus on

268
00:11:32,339 --> 00:11:36,600
what we should be doing in the coming

269
00:11:33,570 --> 00:11:38,959
years so in addition to the white papers

270
00:11:36,600 --> 00:11:41,339
this will be another place for people to

271
00:11:38,958 --> 00:11:46,409

convey their thoughts to us that which

272

00:11:41,339 --> 00:11:49,160

would be great now each year we do about

273

00:11:46,409 --> 00:11:51,750

40 press releases or so this is just a

274

00:11:49,159 --> 00:11:54,600

kind of an eye chart and you just look

275

00:11:51,750 --> 00:11:58,649

at the bars that on the chart and notice

276

00:11:54,600 --> 00:12:00,959

that the y-axis is millions and this is

277

00:11:58,649 --> 00:12:03,570

the potential circulation of the media

278

00:12:00,958 --> 00:12:05,099

outlets that pick up Hubble results so

279

00:12:03,570 --> 00:12:06,720

we typically measure those in hundreds

280

00:12:05,100 --> 00:12:08,459

of millions and you can see that some

281

00:12:06,720 --> 00:12:10,920

things really capture the imagination of

282

00:12:08,458 --> 00:12:14,278

the public I understand from our press

283

00:12:10,919 --> 00:12:17,610

people yesterday that the Eagle Nebula

284

00:12:14,278 --> 00:12:19,528

and m31 images that were released at the

285

00:12:17,610 --> 00:12:21,990

SS this week will probably be somewhere

286
00:12:19,528 --> 00:12:24,990
up around the 500 or 600 million mark on

287
00:12:21,990 --> 00:12:27,500
this particular kind of plot so with

288
00:12:24,990 --> 00:12:29,990
that being said let us help you

289
00:12:27,500 --> 00:12:32,399
communicate your science to the public

290
00:12:29,990 --> 00:12:34,980
alert us to the newsworthy science

291
00:12:32,399 --> 00:12:37,259
results that you have and let's get your

292
00:12:34,980 --> 00:12:42,509
let's get your science results up on to

293
00:12:37,259 --> 00:12:46,500
that chart I have one final slide and

294
00:12:42,509 --> 00:12:50,639
that is the HST budget here's the budget

295
00:12:46,500 --> 00:12:52,708
breakdown between grants and operations

296
00:12:50,639 --> 00:12:55,549
both at the Institute and at Goddard you

297
00:12:52,708 --> 00:12:58,899
can see it's roughly a third third of

298
00:12:55,549 --> 00:13:02,089
I show this for one reason and that's to

299
00:12:58,899 --> 00:13:04,429
let you know that a fair fraction of the

300
00:13:02,090 --> 00:13:05,629
money that's spent on Hubble actually

301
00:13:04,429 --> 00:13:08,269
goes out to the scientific community

302
00:13:05,629 --> 00:13:09,980
directly in the form of grants and we're

303
00:13:08,269 --> 00:13:12,860
committed as a mission to make sure that

304
00:13:09,980 --> 00:13:14,389
that continues we very much like to see

305
00:13:12,860 --> 00:13:16,759
something on the order of twenty eight

306
00:13:14,389 --> 00:13:18,980
to thirty million dollars a year from

307
00:13:16,759 --> 00:13:21,019
the mission budget being put out to the

308
00:13:18,980 --> 00:13:23,840
community directly in the form of a

309
00:13:21,019 --> 00:13:26,179
grants that help support getting the

310
00:13:23,840 --> 00:13:29,600
science out to the public and to our

311
00:13:26,179 --> 00:13:31,039
scientific colleagues so I'll leave you

312
00:13:29,600 --> 00:13:32,060
with one final slide and the thought

313
00:13:31,039 --> 00:13:35,629
from John Bacall

314

00:13:32,059 --> 00:13:36,739
Blake John Bacall we often frame our

315
00:13:35,629 --> 00:13:38,809
understanding what the Space Telescope

316
00:13:36,740 --> 00:13:40,730
will do in terms of what we expect to

317
00:13:38,809 --> 00:13:43,099
find and actually it would be terribly

318
00:13:40,730 --> 00:13:45,470
anticlimactic if in fact we find what we

319
00:13:43,100 --> 00:13:47,060
expect to find the most important

320
00:13:45,470 --> 00:13:48,740
discoveries will provide answers to

321
00:13:47,059 --> 00:13:51,139
questions that we do not yet know how to

322
00:13:48,740 --> 00:13:53,659
ask and will concern objects we have not

323
00:13:51,139 --> 00:13:55,610
yet imagined I suspect that will remain

324
00:13:53,659 --> 00:13:57,799
true throughout Hubble's lifetime and

325
00:13:55,610 --> 00:14:01,149
will almost certainly be the case in the

326
00:13:57,799 --> 00:14:01,149
next five years thank you

327
00:14:18,528 --> 00:14:24,499
okay so it's my pleasure to talk to you

328
00:14:22,548 --> 00:14:27,048

this afternoon about the frontier fields

329

00:14:24,499 --> 00:14:29,928
a major initiative using directors

330

00:14:27,048 --> 00:14:31,668
discretionary time to try to peer deeper

331

00:14:29,928 --> 00:14:32,358
into the universe than we ever have

332

00:14:31,668 --> 00:14:34,938
before

333

00:14:32,359 --> 00:14:37,278
so I'm acting as the PI of this program

334

00:14:34,938 --> 00:14:39,048
on behalf of Mount Mountain and I'm very

335

00:14:37,278 --> 00:14:40,729
privileged to work with a dedicated and

336

00:14:39,048 --> 00:14:44,528
talents a team of people at Space

337

00:14:40,729 --> 00:14:44,528
Telescope in the science Pfitzer Center

338

00:14:45,129 --> 00:14:49,009
so the image in the background here is

339

00:14:47,538 --> 00:14:52,068
one that we all know and love and has

340

00:14:49,009 --> 00:14:53,749
become iconic but more than being a

341

00:14:52,068 --> 00:14:55,988
beautiful image the Hubble ultra-deep

342

00:14:53,749 --> 00:14:57,798
field has really transformed our

343
00:14:55,989 --> 00:15:00,589
understanding of the history of the

344
00:14:57,798 --> 00:15:04,278
universe and in fact it represents a

345
00:15:00,589 --> 00:15:06,949
huge investment of Hubble time so as

346
00:15:04,278 --> 00:15:08,509
this version of the observations the

347
00:15:06,948 --> 00:15:10,788
infrared observations of the Hubble

348
00:15:08,509 --> 00:15:12,318
ultra-deep field were wrapping up the

349
00:15:10,788 --> 00:15:14,989
director of Space Telescope mount

350
00:15:12,318 --> 00:15:16,519
Mountain asked the question could we top

351
00:15:14,989 --> 00:15:18,999
the Hubble ultra-deep field

352
00:15:16,519 --> 00:15:21,619
can we appear deeper into the universe

353
00:15:18,999 --> 00:15:23,989
with Hubble before the launch of the

354
00:15:21,619 --> 00:15:26,359
James Webb Space Telescope is there

355
00:15:23,989 --> 00:15:29,599
exciting D field science left to be done

356
00:15:26,359 --> 00:15:31,129
with Hubble in its remaining years so he

357
00:15:29,599 --> 00:15:33,289
posed this question to a group of

358
00:15:31,129 --> 00:15:34,849
astronomers and of course when you ask

359
00:15:33,288 --> 00:15:36,739
them could they do interesting things

360
00:15:34,849 --> 00:15:40,699
with lots of Hubble time the answer is

361
00:15:36,739 --> 00:15:42,859
usually yes and the answer they came

362
00:15:40,698 --> 00:15:45,558
back with was to use a trick you use

363
00:15:42,859 --> 00:15:48,889
gravitational lensing that is nature's

364
00:15:45,558 --> 00:15:50,658
telescopes strong lensing clusters plus

365
00:15:48,889 --> 00:15:53,658
Hubble to peer deeper into the universe

366
00:15:50,658 --> 00:15:57,259
than we have before using less exposure

367
00:15:53,658 --> 00:15:59,958
time and they propose not just looking

368
00:15:57,259 --> 00:16:02,839
at one strong lensing cluster but to

369
00:15:59,958 --> 00:16:04,908
look at six and to put turn on both of

370
00:16:02,839 --> 00:16:06,949
Hubble's primary workhorse cameras and

371

00:16:04,908 --> 00:16:10,698
use those in parallel so that you will

372
00:16:06,948 --> 00:16:13,008
get six lens fields in addition to six

373
00:16:10,698 --> 00:16:15,108
blank fields and this would add up to an

374
00:16:13,009 --> 00:16:19,639
exciting new parameter space for

375
00:16:15,109 --> 00:16:21,918
exploring the distant universe so the

376
00:16:19,639 --> 00:16:23,839
primary science goals of this program as

377
00:16:21,918 --> 00:16:25,728
outlined by that science working group

378
00:16:23,839 --> 00:16:27,799
are firstly

379
00:16:25,729 --> 00:16:29,389
simply to see deeper than we have before

380
00:16:27,798 --> 00:16:31,549
and to probe those galaxies that are

381
00:16:29,389 --> 00:16:34,070
intrinsically fainter

382
00:16:31,549 --> 00:16:37,609
anything we've seen and those galaxies

383
00:16:34,070 --> 00:16:39,080
that are that we can see at times before

384
00:16:37,610 --> 00:16:42,050
and during the epoch of reorganization

385
00:16:39,080 --> 00:16:44,028

and by going this deep we would be able

386

00:16:42,049 --> 00:16:46,099
to trace the early star formation

387

00:16:44,028 --> 00:16:48,470
histories of those galaxies small enough

388

00:16:46,100 --> 00:16:51,769
faint enough to be the early progenitors

389

00:16:48,470 --> 00:16:53,480
of our own Milky Way of course

390

00:16:51,769 --> 00:16:55,129
gravitational lensing not only makes

391

00:16:53,480 --> 00:16:56,720
things appear brighter but it stretches

392

00:16:55,129 --> 00:16:59,120
them out and so we would have the

393

00:16:56,720 --> 00:17:01,250
opportunity to study these galaxies and

394

00:16:59,120 --> 00:17:03,740
greater spatial with greater spatial

395

00:17:01,250 --> 00:17:06,230
resolution than possible with Hubble

396

00:17:03,740 --> 00:17:08,959
alone looking at their resolved

397

00:17:06,230 --> 00:17:11,120
structures their colors their sizes and

398

00:17:08,959 --> 00:17:12,558
some of these galaxies may be boosted

399

00:17:11,119 --> 00:17:16,578
enough for ground-based spectroscopic

400
00:17:12,558 --> 00:17:18,230
follow-up finally with six lens fields

401
00:17:16,578 --> 00:17:20,659
and six parallel fields we could build

402
00:17:18,230 --> 00:17:25,189
up a better statistical picture of

403
00:17:20,660 --> 00:17:27,110
galaxy formation at early times so this

404
00:17:25,189 --> 00:17:29,509
slide is my one slide summary of our

405
00:17:27,109 --> 00:17:31,039
observing program all of these

406
00:17:29,509 --> 00:17:33,019
observations with Hubble are beyond

407
00:17:31,039 --> 00:17:35,690
being done with directors discretionary

408
00:17:33,019 --> 00:17:38,929
time and so for each cluster parallel

409
00:17:35,690 --> 00:17:43,400
pointing we are dedicating 140 HST

410
00:17:38,929 --> 00:17:46,009
orbits using both the ACS optical imager

411
00:17:43,400 --> 00:17:49,179
and the wide field Infrared channel in

412
00:17:46,009 --> 00:17:52,190
parallel obtaining optical and infrared

413
00:17:49,179 --> 00:17:55,370
images and seven bands going down to

414
00:17:52,190 --> 00:17:57,140
27th magnitude and our observing plan is

415
00:17:55,369 --> 00:17:58,969
such that we're looking at two of these

416
00:17:57,140 --> 00:18:01,900
clusters per year spread out over three

417
00:17:58,970 --> 00:18:04,669
years for a total of 840 orbits a

418
00:18:01,900 --> 00:18:06,890
spitzer has also dedicated a major chunk

419
00:18:04,669 --> 00:18:09,320
of its directors discretionary time and

420
00:18:06,890 --> 00:18:11,150
so for every cluster and blank field

421
00:18:09,319 --> 00:18:13,668
pointing they will be exceptionally deep

422
00:18:11,150 --> 00:18:16,220
Iraq channel 1 and channel 2 imaging and

423
00:18:13,669 --> 00:18:17,990
all of this data is public the raw data

424
00:18:16,220 --> 00:18:20,900
is public and we're working very hard at

425
00:18:17,990 --> 00:18:25,640
Space Telescope to produce high quality

426
00:18:20,900 --> 00:18:28,730
science images as well so these are our

427
00:18:25,640 --> 00:18:31,520
six frontier fields the clusters and

428

00:18:28,730 --> 00:18:33,890
these were selected in consultation with

429
00:18:31,519 --> 00:18:36,440
the community primarily based on the

430
00:18:33,890 --> 00:18:37,880
known lensing strength at the time but

431
00:18:36,440 --> 00:18:40,070
also on their locate based on their

432
00:18:37,880 --> 00:18:42,140
location in the sky how dark was the

433
00:18:40,069 --> 00:18:45,429
background and whether or not there was

434
00:18:42,140 --> 00:18:46,900
any ancillary data available

435
00:18:45,430 --> 00:18:49,470
and I'll just highlight our last two

436
00:18:46,900 --> 00:18:51,610
clusters recently these were approved

437
00:18:49,470 --> 00:18:54,579
and we'll be going forward with the

438
00:18:51,609 --> 00:18:56,379
observations for these in cycle 23 and I

439
00:18:54,579 --> 00:18:57,939
recommend you take a look at at the call

440
00:18:56,380 --> 00:19:00,160
for proposals that went out yesterday

441
00:18:57,940 --> 00:19:04,480
for more details about how to use these

442
00:19:00,160 --> 00:19:06,430

for your science so this is a beautiful

443

00:19:04,480 --> 00:19:08,380

image which may be familiar to you it's

444

00:19:06,430 --> 00:19:10,930

been shown a few times around at the

445

00:19:08,380 --> 00:19:14,680

double-a s meeting this year this is our

446

00:19:10,930 --> 00:19:16,450

first cluster Abell 2744 all of the data

447

00:19:14,680 --> 00:19:18,400

is in hand for this cluster you can go

448

00:19:16,450 --> 00:19:20,049

to our website get the raw data get to

449

00:19:18,400 --> 00:19:23,230

the reduced data get lots of beautiful

450

00:19:20,049 --> 00:19:25,990

images but I also like to show an

451

00:19:23,230 --> 00:19:30,430

amped-up version of this image so this

452

00:19:25,990 --> 00:19:33,160

is the infrared version of a bell 27:44

453

00:19:30,430 --> 00:19:35,110

with the stretch maximized to show just

454

00:19:33,160 --> 00:19:37,210

how deep we're really going when we look

455

00:19:35,109 --> 00:19:38,979

at this cluster so if you're a cluster

456

00:19:37,210 --> 00:19:40,660

scientist you'll see we've got lots of

457
00:19:38,980 --> 00:19:43,120
inter cluster light you can see the

458
00:19:40,660 --> 00:19:45,550
tidal features of cluster galaxies that

459
00:19:43,119 --> 00:19:47,139
are interacting with each other and if

460
00:19:45,549 --> 00:19:48,669
you were to zoom in very close in this

461
00:19:47,140 --> 00:19:51,340
image you'll see we'll are also finding

462
00:19:48,670 --> 00:19:53,140
lots of little faint red galaxies in the

463
00:19:51,339 --> 00:19:59,709
background which of course is one of the

464
00:19:53,140 --> 00:20:02,170
primary goals of this program to

465
00:19:59,710 --> 00:20:03,789
interpret this image you need to have an

466
00:20:02,170 --> 00:20:07,180
understanding of the optics of the

467
00:20:03,789 --> 00:20:08,920
cluster so we've gotten a number of

468
00:20:07,180 --> 00:20:10,840
modelers from the community to provide

469
00:20:08,920 --> 00:20:13,300
us their best models for the maps of the

470
00:20:10,839 --> 00:20:15,819
dark matter and the lensing strengths of

471
00:20:13,299 --> 00:20:18,009
these clusters so shown in blue overlaid

472
00:20:15,819 --> 00:20:19,720
in blue is that blue is an estimate of

473
00:20:18,009 --> 00:20:23,230
the Dark Matter mass distribution in the

474
00:20:19,720 --> 00:20:25,500
cluster and in red is the critical curve

475
00:20:23,230 --> 00:20:28,420
so those areas of highest magnification

476
00:20:25,500 --> 00:20:31,299
so background galaxies that that are

477
00:20:28,420 --> 00:20:33,820
fall behind those critical lines can be

478
00:20:31,299 --> 00:20:36,940
magnified by factors up to a 10 or even

479
00:20:33,819 --> 00:20:39,099
100 and it's along those let those red

480
00:20:36,940 --> 00:20:44,080
regions where we are getting the deepest

481
00:20:39,099 --> 00:20:46,539
ever views into the universe so we've

482
00:20:44,079 --> 00:20:48,490
been going along here for over a year

483
00:20:46,539 --> 00:20:51,339
now and I'm pleased to say we have some

484
00:20:48,490 --> 00:20:53,410
very exciting science results we have in

485

00:20:51,339 --> 00:20:55,929
fact detected one of the most distant

486
00:20:53,410 --> 00:20:57,610
and intrinsically faintest objects so

487
00:20:55,930 --> 00:21:00,430
this is a redshift 10

488
00:20:57,609 --> 00:21:03,339
galaxy candidate which is triply imaged

489
00:21:00,430 --> 00:21:04,600
by this cluster and so one of the

490
00:21:03,339 --> 00:21:07,179
reasons why we think this is such a

491
00:21:04,599 --> 00:21:09,250
secure candidate for a redshift n object

492
00:21:07,180 --> 00:21:11,890
is not just the fact that has extremely

493
00:21:09,250 --> 00:21:14,319
red colors but where it lies relative to

494
00:21:11,890 --> 00:21:16,540
those critical curves its position it

495
00:21:14,319 --> 00:21:19,029
positions in this image provide further

496
00:21:16,539 --> 00:21:23,409
evidence of it being at an exceptionally

497
00:21:19,029 --> 00:21:25,809
high redshift so this is our second

498
00:21:23,410 --> 00:21:27,640
cluster Maxima for 1/6 all of the data

499
00:21:25,809 --> 00:21:31,059

for this cluster is also in hand

500

00:21:27,640 --> 00:21:33,850

unavailable and available online and

501

00:21:31,059 --> 00:21:36,009

these first two HST frontier fields and

502

00:21:33,849 --> 00:21:37,779

their parallels have have really been a

503

00:21:36,009 --> 00:21:39,460

success they've dramatically increased

504

00:21:37,779 --> 00:21:43,299

the number of intrinsically faint

505

00:21:39,460 --> 00:21:46,960

galaxies known to be in the first

506

00:21:43,299 --> 00:21:49,750

billion years of the universe why is

507

00:21:46,960 --> 00:21:51,970

this important well this is a result

508

00:21:49,750 --> 00:21:55,299

from a very recent paper looking just at

509

00:21:51,970 --> 00:21:58,509

the first cluster Abell 2744 this is a

510

00:21:55,299 --> 00:22:01,240

redshift 7 UV luminosity function I show

511

00:21:58,509 --> 00:22:03,039

with a black arrow the limit for the

512

00:22:01,240 --> 00:22:04,630

Hubble ultra-deep field and you can see

513

00:22:03,039 --> 00:22:07,509

we're going several magnitudes fainter

514
00:22:04,630 --> 00:22:09,160
than that one of the reasons why you

515
00:22:07,509 --> 00:22:10,900
know we're not just posted we're not

516
00:22:09,160 --> 00:22:12,850
just collecting little faint galaxies

517
00:22:10,900 --> 00:22:15,370
this is actually quite important because

518
00:22:12,849 --> 00:22:17,740
understanding how many faint galaxies

519
00:22:15,369 --> 00:22:20,259
they are can help us count up the number

520
00:22:17,740 --> 00:22:21,880
of photons that could contribute to the

521
00:22:20,259 --> 00:22:24,549
reionization of the universe at this

522
00:22:21,880 --> 00:22:26,260
epoch so as we go forward and we collect

523
00:22:24,549 --> 00:22:28,149
the rest of the clusters we'll be able

524
00:22:26,259 --> 00:22:29,559
to place incredibly good constraints on

525
00:22:28,150 --> 00:22:31,960
the slope of the faint end of the

526
00:22:29,559 --> 00:22:35,889
luminosity function during the era of

527
00:22:31,960 --> 00:22:37,509
reionisation of course there's lots and

528
00:22:35,890 --> 00:22:39,190
lots of other science that can be done

529
00:22:37,509 --> 00:22:40,839
with these images and I think that's one

530
00:22:39,190 --> 00:22:43,720
of the more exciting aspects of the

531
00:22:40,839 --> 00:22:45,069
program you know it's not just redshift

532
00:22:43,720 --> 00:22:47,049
10 galaxies that are interesting

533
00:22:45,069 --> 00:22:49,269
galaxies at cosmic high noon at rest

534
00:22:47,049 --> 00:22:50,589
just one to four will also be magnified

535
00:22:49,269 --> 00:22:52,839
and stretched and we can do

536
00:22:50,589 --> 00:22:56,049
groundbreaking science with those images

537
00:22:52,839 --> 00:22:57,699
on the clusters themselves will be you

538
00:22:56,049 --> 00:22:59,859
know can be studied in great detail

539
00:22:57,700 --> 00:23:01,360
we'll be able to map out the dark matter

540
00:22:59,859 --> 00:23:04,509
and the substructure within those

541
00:23:01,359 --> 00:23:06,759
clusters to unprecedented levels study

542

00:23:04,509 --> 00:23:09,039
the cluster galaxies the dwarfs and

543
00:23:06,759 --> 00:23:10,849
inter cluster light and some of the most

544
00:23:09,039 --> 00:23:12,740
exciting science is coming out of the

545
00:23:10,849 --> 00:23:14,599
franzine science looking for supernovae

546
00:23:12,740 --> 00:23:17,569
in these fields and there are lots of

547
00:23:14,599 --> 00:23:20,959
other things on going i'll just note

548
00:23:17,569 --> 00:23:23,200
that we have three geo programs that are

549
00:23:20,960 --> 00:23:27,350
getting ancillary data on these these

550
00:23:23,200 --> 00:23:29,840
clusters in the UV with the wif c3i are

551
00:23:27,349 --> 00:23:32,089
grism and then Steve Rodney's program

552
00:23:29,839 --> 00:23:33,949
which is a t oo program to follow up any

553
00:23:32,089 --> 00:23:36,709
exciting transients and there's

554
00:23:33,950 --> 00:23:39,110
something like 10 or 11 HST archival and

555
00:23:36,710 --> 00:23:41,569
theory programs from cycle 21 and 22

556
00:23:39,109 --> 00:23:44,149

that are dedicated to doing science with

557

00:23:41,569 --> 00:23:46,039

these data and so I encourage you to

558

00:23:44,150 --> 00:23:47,540

look again at the call for proposals and

559

00:23:46,039 --> 00:23:52,009

think about what you might want to do

560

00:23:47,539 --> 00:23:55,279

for cycle 23 I mentioned Dark Matter as

561

00:23:52,009 --> 00:23:57,319

one of the things that you can do and

562

00:23:55,279 --> 00:23:59,149

these data are also going to be

563

00:23:57,319 --> 00:24:00,559

transformative in our understanding of

564

00:23:59,150 --> 00:24:02,900

the Dark Matter distribution and

565

00:24:00,559 --> 00:24:05,359

clusters the fact that we are going so

566

00:24:02,900 --> 00:24:08,450

deep provides many multiplied image

567

00:24:05,359 --> 00:24:10,059

galaxies which provides allows us to map

568

00:24:08,450 --> 00:24:13,130

out the dark matter to unprecedented

569

00:24:10,059 --> 00:24:14,720

resolution and precision and so this is

570

00:24:13,130 --> 00:24:18,080

a map of the Dark Matter distribution

571
00:24:14,720 --> 00:24:22,370
made by Mathilde jazak earlier or last

572
00:24:18,079 --> 00:24:24,319
year this is our third cluster max oh

573
00:24:22,369 --> 00:24:26,719
seven one seven we're about halfway done

574
00:24:24,319 --> 00:24:29,509
with this cluster this image is of the

575
00:24:26,720 --> 00:24:33,230
ACS optical we're going to start getting

576
00:24:29,509 --> 00:24:35,150
the whiff c3 IR in a few weeks here we

577
00:24:33,230 --> 00:24:36,829
as of yesterday we're officially halfway

578
00:24:35,150 --> 00:24:39,200
complete with our frontier field

579
00:24:36,829 --> 00:24:40,909
observations and as I said those last

580
00:24:39,200 --> 00:24:44,059
two clusters and parallels are approved

581
00:24:40,910 --> 00:24:46,820
for next year's observations so this is

582
00:24:44,059 --> 00:24:50,750
the cluster that we were getting data

583
00:24:46,819 --> 00:24:52,879
for yesterday max 11:49 we completed the

584
00:24:50,750 --> 00:24:55,940
whiff c3 our observations will start

585
00:24:52,880 --> 00:24:57,710
again in April with ACS the background

586
00:24:55,940 --> 00:25:00,110
image here is beautiful but not quite as

587
00:24:57,710 --> 00:25:02,059
deep as our frontier fields will be this

588
00:25:00,109 --> 00:25:04,939
is taken from The Clash survey of a few

589
00:25:02,059 --> 00:25:06,919
years ago and I'm just going to zoom in

590
00:25:04,940 --> 00:25:09,769
here on the center of this cluster and

591
00:25:06,920 --> 00:25:12,410
sort of highlight this spiral galaxy in

592
00:25:09,769 --> 00:25:14,240
the middle so this is a spiral galaxy

593
00:25:12,410 --> 00:25:17,180
that's a background galaxy behind the

594
00:25:14,240 --> 00:25:18,169
cluster one of its arms as being lens by

595
00:25:17,180 --> 00:25:20,419
that one of the

596
00:25:18,169 --> 00:25:23,960
little red cluster galaxies in the

597
00:25:20,419 --> 00:25:26,389
middle and this object has been a source

598
00:25:23,960 --> 00:25:27,798
of one of the most unexpected things I

599

00:25:26,388 --> 00:25:29,628
think is coming out of the frontier

600
00:25:27,798 --> 00:25:31,638
fields so for any of the press in the

601
00:25:29,628 --> 00:25:34,548
audience this is embargoed but I just

602
00:25:31,638 --> 00:25:36,678
had to share these images see Rodney

603
00:25:34,548 --> 00:25:40,190
talked about this yesterday at the

604
00:25:36,679 --> 00:25:42,440
frontier fields hyperwall so the so this

605
00:25:40,190 --> 00:25:44,570
an object I said the this cluster was

606
00:25:42,440 --> 00:25:47,629
observed in 2011 as part of the clash

607
00:25:44,569 --> 00:25:50,928
program glass which is the grism program

608
00:25:47,628 --> 00:25:52,699
went back in November and the supernova

609
00:25:50,929 --> 00:25:54,470
team including Patrick Kelly and Steve

610
00:25:52,700 --> 00:25:57,919
Rodney were looking at these images and

611
00:25:54,470 --> 00:26:02,358
bam a pop not one not two not three but

612
00:25:57,919 --> 00:26:04,460
four images and they were incredibly

613
00:26:02,358 --> 00:26:06,980

lucky because we were about to start our

614

00:26:04,460 --> 00:26:09,739

seven week observing campaign getting

615

00:26:06,980 --> 00:26:12,440

seventy orbits on this cluster shortly

616

00:26:09,739 --> 00:26:14,269

thereafter so this object is actually

617

00:26:12,440 --> 00:26:16,220

the first detected multiply image

618

00:26:14,269 --> 00:26:19,849

supernova if christened its supernova

619

00:26:16,220 --> 00:26:23,720

ref stall after a seminal paper but

620

00:26:19,849 --> 00:26:25,819

that's not all so the arm of this spiral

621

00:26:23,720 --> 00:26:27,889

is being multiplied imaged by that

622

00:26:25,819 --> 00:26:31,249

little red galaxy but the spiral galaxy

623

00:26:27,888 --> 00:26:33,349

itself appears multiple times as well so

624

00:26:31,249 --> 00:26:37,639

there are three more images of that

625

00:26:33,349 --> 00:26:39,498

spiral arm in the in this cluster and we

626

00:26:37,638 --> 00:26:41,808

think that that super manova may have

627

00:26:39,499 --> 00:26:44,329

appeared several times before and will

628
00:26:41,808 --> 00:26:46,638
appear again so the light from this

629
00:26:44,329 --> 00:26:48,589
supernova has traveled seven has

630
00:26:46,638 --> 00:26:51,709
traveled or will travel seven separate

631
00:26:48,589 --> 00:26:56,778
paths around max 11:49 on its way to

632
00:26:51,710 --> 00:26:59,929
earth so just to summarize here with the

633
00:26:56,778 --> 00:27:01,788
ways that you can use this data as I

634
00:26:59,929 --> 00:27:03,769
said we had the raw data the science

635
00:27:01,788 --> 00:27:07,128
quality data and lensing maps are all

636
00:27:03,769 --> 00:27:08,929
public on mast and on our website we're

637
00:27:07,128 --> 00:27:10,969
done with the first two clusters we're

638
00:27:08,929 --> 00:27:12,528
halfway through with the second two

639
00:27:10,970 --> 00:27:14,989
clusters and they're breaking new

640
00:27:12,528 --> 00:27:17,329
frontiers left and right we had a

641
00:27:14,989 --> 00:27:18,798
successful midterm review and we're

642
00:27:17,329 --> 00:27:21,769
going forward with those last two

643
00:27:18,798 --> 00:27:23,538
clusters in cycle 23 and we're also

644
00:27:21,769 --> 00:27:25,519
thinking about providing additional

645
00:27:23,538 --> 00:27:28,489
funding opportunities for updating and

646
00:27:25,519 --> 00:27:30,259
improving the lensing models I didn't

647
00:27:28,489 --> 00:27:31,309
have any time to talk about Spitzer and

648
00:27:30,259 --> 00:27:33,349
Chandra but this

649
00:27:31,309 --> 00:27:34,639
Iraq observations for those last two

650
00:27:33,349 --> 00:27:37,339
clusters are underway

651
00:27:34,640 --> 00:27:39,500
Chandra there's lots of observations

652
00:27:37,339 --> 00:27:42,829
being done by Steve Murray and by

653
00:27:39,500 --> 00:27:44,690
Christine Jones foreman and in August at

654
00:27:42,829 --> 00:27:46,759
the IU there will be a several day

655
00:27:44,690 --> 00:27:50,410
workshop highlighting the frontier

656

00:27:46,759 --> 00:27:50,410
fields so thank you very much

657
00:28:22,509 --> 00:28:28,480
okay well the 25th anniversary of Hubble

658
00:28:25,240 --> 00:28:31,240
is obviously a huge milestone and we

659
00:28:28,480 --> 00:28:34,120
have an entire year of activities and

660
00:28:31,240 --> 00:28:36,789
events and programs planned starting

661
00:28:34,119 --> 00:28:38,979
really here at this meeting you've all

662
00:28:36,789 --> 00:28:41,950
seen all the great press that's come out

663
00:28:38,980 --> 00:28:43,900
all the the hype on social media from

664
00:28:41,950 --> 00:28:46,240
the release of the images this week so

665
00:28:43,900 --> 00:28:48,340
things are really kicking off this week

666
00:28:46,240 --> 00:28:50,769
for this year of celebration so I just

667
00:28:48,339 --> 00:28:52,599
wanted to highlight some of the our

668
00:28:50,769 --> 00:28:55,450
high-level plans and some of the the

669
00:28:52,599 --> 00:28:57,009
specifics that we have going on in the

670
00:28:55,450 --> 00:29:01,390

next year to celebrate Hubble's 25th

671

00:28:57,009 --> 00:29:04,119

anniversary so in a high level and we're

672

00:29:01,390 --> 00:29:07,030

sort of going on the the broad basic

673

00:29:04,119 --> 00:29:09,369

themes of celebrating this past quarter

674

00:29:07,029 --> 00:29:12,129

century of discovery and inspiration and

675

00:29:09,369 --> 00:29:15,189

really the effect on culture that Hubble

676

00:29:12,130 --> 00:29:17,919

has had and we want to not only look to

677

00:29:15,190 --> 00:29:20,259

the past but we want to also emphasize

678

00:29:17,919 --> 00:29:22,150

that the Hubble is going strong we

679

00:29:20,259 --> 00:29:24,849

expect it to last out till 2020 maybe

680

00:29:22,150 --> 00:29:29,410

longer and then of course emphasized

681

00:29:24,849 --> 00:29:31,629

Hubble's successor JWST and again sort

682

00:29:29,410 --> 00:29:33,548

of taking taking advantage of the fact

683

00:29:31,630 --> 00:29:35,980

that the Hubble is really infiltrated

684

00:29:33,548 --> 00:29:38,259

our culture in all these different

685
00:29:35,980 --> 00:29:41,019
realms we want to get out that message

686
00:29:38,259 --> 00:29:42,579
and be really promoting the the idea

687
00:29:41,019 --> 00:29:44,619
that Hubble is the people's telescope

688
00:29:42,579 --> 00:29:47,409
it's not just a tool for astronomers

689
00:29:44,619 --> 00:29:49,599
that it's something that the public that

690
00:29:47,410 --> 00:29:51,580
our society can can celebrate and we

691
00:29:49,599 --> 00:29:54,849
also want to talk about how Hubble is a

692
00:29:51,579 --> 00:29:57,339
human story you know the the science

693
00:29:54,849 --> 00:29:59,709
that we do we people do the science and

694
00:29:57,339 --> 00:30:01,659
in addition to that of course Hubble has

695
00:29:59,710 --> 00:30:03,490
the great legacy of having had

696
00:30:01,660 --> 00:30:05,740
astronauts go to service it and that's a

697
00:30:03,490 --> 00:30:06,970
story that really resonates with the

698
00:30:05,740 --> 00:30:09,190
public and so we really want to

699
00:30:06,970 --> 00:30:12,660
emphasize the the human side of Hubble

700
00:30:09,190 --> 00:30:14,620
all along through the next year and so

701
00:30:12,660 --> 00:30:18,460
anytime we're doing these sort of

702
00:30:14,619 --> 00:30:20,048
outreach communications plans we take an

703
00:30:18,460 --> 00:30:21,579
audience based approach to make sure

704
00:30:20,048 --> 00:30:23,339
that what we're getting out is

705
00:30:21,579 --> 00:30:25,960
appropriate for the different audiences

706
00:30:23,339 --> 00:30:27,730
we really want to celebrate and engage

707
00:30:25,960 --> 00:30:29,950
what John Grunsfeld calls the Hubble

708
00:30:27,730 --> 00:30:32,169
generation so this generation of people

709
00:30:29,950 --> 00:30:34,000
25 and younger that have grown up with

710
00:30:32,169 --> 00:30:34,809
Hubble always having been in space and

711
00:30:34,000 --> 00:30:37,720
so

712
00:30:34,808 --> 00:30:41,168
we really want to emphasize on to that

713

00:30:37,720 --> 00:30:42,940
generation in our outreach events so we

714
00:30:41,169 --> 00:30:46,450
have a whole year of events and programs

715
00:30:42,940 --> 00:30:48,970
and products and we have of course along

716
00:30:46,450 --> 00:30:50,679
with the the specific discrete events we

717
00:30:48,970 --> 00:30:52,990
have a really robust social media and

718
00:30:50,679 --> 00:30:54,730
traditional media outreach plan which

719
00:30:52,990 --> 00:30:57,490
again has already started really in

720
00:30:54,730 --> 00:31:00,339
earnest this week our audience based

721
00:30:57,490 --> 00:31:04,929
approach is what you would expect of

722
00:31:00,339 --> 00:31:07,898
course we are celebrating and and really

723
00:31:04,929 --> 00:31:09,940
trying to to get the message out about

724
00:31:07,898 --> 00:31:12,428
that the team that built Hubble and the

725
00:31:09,940 --> 00:31:15,460
teams of scientists that have have used

726
00:31:12,429 --> 00:31:17,409
Hubble over the past 25 years and and of

727
00:31:15,460 --> 00:31:19,720

course the public is a big target of our

728

00:31:17,409 --> 00:31:21,309

outreach as always we really want to

729

00:31:19,720 --> 00:31:24,308

focus on on getting to non-traditional

730

00:31:21,308 --> 00:31:25,960

audiences you know there's a whole host

731

00:31:24,308 --> 00:31:27,788

of people out there that are already big

732

00:31:25,960 --> 00:31:29,769

NASA fans and we're glad about that

733

00:31:27,788 --> 00:31:31,990

we're happy about that we want to reach

734

00:31:29,769 --> 00:31:35,440

into some more audiences that might not

735

00:31:31,990 --> 00:31:37,509

already sort of be our fans and try to

736

00:31:35,440 --> 00:31:40,298

reach out to them and to get them

737

00:31:37,509 --> 00:31:42,429

engaged in the Hubble celebrations and

738

00:31:40,298 --> 00:31:44,798

then of course we have a very robust

739

00:31:42,429 --> 00:31:47,110

plan to reach out to teachers and

740

00:31:44,798 --> 00:31:48,788

students in the classroom which the

741

00:31:47,109 --> 00:31:51,758

Space Telescope Science Institute has a

742
00:31:48,788 --> 00:31:53,499
really great an excellent team that has

743
00:31:51,759 --> 00:31:55,690
been doing that for many years already

744
00:31:53,499 --> 00:31:58,629
and so we're just going to incorporate

745
00:31:55,690 --> 00:32:00,610
Hubble 25th into all of the great things

746
00:31:58,628 --> 00:32:02,199
that that Space Telescope does over the

747
00:32:00,609 --> 00:32:04,298
next year and then of course there's our

748
00:32:02,200 --> 00:32:07,419
external stakeholders or friends on

749
00:32:04,298 --> 00:32:09,368
Capitol Hill and our corporate partners

750
00:32:07,419 --> 00:32:11,769
that will be involved in a lot of these

751
00:32:09,368 --> 00:32:15,009
things as well this is all a big

752
00:32:11,769 --> 00:32:16,179
collaboration between NASA ISA obviously

753
00:32:15,009 --> 00:32:19,240
the Space Telescope Science Institute

754
00:32:16,179 --> 00:32:22,059
and then our external partners and also

755
00:32:19,240 --> 00:32:24,339
our have have a big role in a lot of our

756
00:32:22,058 --> 00:32:25,960
events as well so when I tell you about

757
00:32:24,339 --> 00:32:27,220
some of the specific things that we have

758
00:32:25,960 --> 00:32:29,350
planned and this is just going to

759
00:32:27,220 --> 00:32:30,970
scratch the surface of everything and

760
00:32:29,349 --> 00:32:33,959
just keep in mind again that everything

761
00:32:30,970 --> 00:32:36,850
that we do is going to be amplified by

762
00:32:33,960 --> 00:32:38,769
traditional and social media so the

763
00:32:36,849 --> 00:32:40,898
first big thing of course is a

764
00:32:38,769 --> 00:32:43,899
celebration event at the National Air

765
00:32:40,898 --> 00:32:45,088
and Space Museum in Washington DC so we

766
00:32:43,898 --> 00:32:47,818
have the

767
00:32:45,088 --> 00:32:49,588
the evenings secured on April 24th which

768
00:32:47,818 --> 00:32:52,739
is of course the launch anniversary and

769
00:32:49,588 --> 00:32:55,739
so that will be a large event to to

770

00:32:52,739 --> 00:32:59,278
celebrate to celebrate the launch and in

771
00:32:55,739 --> 00:33:00,449
addition to to that event IMAX has

772
00:32:59,278 --> 00:33:02,699
confirmed that they're going to

773
00:33:00,449 --> 00:33:04,709
re-release Hubble 3d in the month of

774
00:33:02,699 --> 00:33:06,719
April of this year so if you haven't

775
00:33:04,709 --> 00:33:09,359
seen that be sure to check out your

776
00:33:06,719 --> 00:33:12,119
local IMAX and it's a really great film

777
00:33:09,358 --> 00:33:14,009
so one of the things that we wanted to

778
00:33:12,118 --> 00:33:16,078
do for that event obviously only a

779
00:33:14,009 --> 00:33:18,269
certain number of people can attend it

780
00:33:16,078 --> 00:33:21,928
so we are planning to webcast that event

781
00:33:18,269 --> 00:33:23,759
and then have science centers planet

782
00:33:21,929 --> 00:33:26,038
area and all the NASA centers sort of

783
00:33:23,759 --> 00:33:28,108
host their own satellite sort of

784
00:33:26,038 --> 00:33:29,878

birthday parties for Hubble around the

785

00:33:28,108 --> 00:33:32,759

webcast and then kind of put their own

786

00:33:29,878 --> 00:33:34,798

Flair on whatever they want to do as to

787

00:33:32,759 --> 00:33:37,229

have their own localized event so we're

788

00:33:34,798 --> 00:33:39,719

envisioning you know a nationwide and

789

00:33:37,229 --> 00:33:43,739

even a worldwide celebration on that day

790

00:33:39,719 --> 00:33:46,558

of the launch anniversary so in addition

791

00:33:43,739 --> 00:33:48,538

to that all the NASA centers are engaged

792

00:33:46,558 --> 00:33:50,098

in the anniversary and they all have

793

00:33:48,538 --> 00:33:52,769

their again their different sort of spin

794

00:33:50,098 --> 00:33:55,048

that they'll put on on Hubble um a lot

795

00:33:52,769 --> 00:33:57,899

of the center's have besides Goddard

796

00:33:55,048 --> 00:34:00,179

obviously Goddard a big Center but many

797

00:33:57,898 --> 00:34:01,768

of the NASA centers had had parts in in

798

00:34:00,179 --> 00:34:04,769

the development of Hubble and the

799
00:34:01,769 --> 00:34:06,929
engineering especially so we're getting

800
00:34:04,769 --> 00:34:09,028
all the NASA centers engaged and they

801
00:34:06,929 --> 00:34:11,338
have their own sort of events plan in

802
00:34:09,028 --> 00:34:15,539
addition to the April 24th sort of

803
00:34:11,338 --> 00:34:17,969
Keystone event we're working on a big

804
00:34:15,539 --> 00:34:21,149
event the next day on April 25th that's

805
00:34:17,969 --> 00:34:23,189
Saturday at var hozy many of the

806
00:34:21,148 --> 00:34:24,659
astronauts the servicing mission and

807
00:34:23,190 --> 00:34:26,789
deployment astronauts will be in town

808
00:34:24,659 --> 00:34:28,349
for the event on the 24th so we wanted

809
00:34:26,789 --> 00:34:30,690
to take that great opportunity while we

810
00:34:28,349 --> 00:34:33,329
have all the astronauts in town to come

811
00:34:30,690 --> 00:34:35,250
up and have a big public event so we're

812
00:34:33,329 --> 00:34:38,099
working with the Smithsonian to to plan

813
00:34:35,250 --> 00:34:40,559
a big public event on that Saturday the

814
00:34:38,099 --> 00:34:42,838
25th attitude raha Zi with astronauts so

815
00:34:40,559 --> 00:34:44,369
that should be a lot of fun and we'll

816
00:34:42,838 --> 00:34:48,719
also look into the possibility of doing

817
00:34:44,369 --> 00:34:52,200
some webcast of that event as well New

818
00:34:48,719 --> 00:34:54,209
York City is very interested and already

819
00:34:52,199 --> 00:34:56,668
involved in many ways in celebrating

820
00:34:54,210 --> 00:34:58,329
Hubble and there's so many I mean

821
00:34:56,668 --> 00:35:00,849
there's several different

822
00:34:58,329 --> 00:35:02,349
museums which most of us familiar for

823
00:35:00,849 --> 00:35:04,269
and the American Museum of national

824
00:35:02,349 --> 00:35:06,069
history there's the intrepid museum the

825
00:35:04,269 --> 00:35:07,900
World Science Festival takes place every

826
00:35:06,070 --> 00:35:09,460
summer in New York City and so there's

827

00:35:07,900 --> 00:35:11,260
all these different groups that are all

828
00:35:09,460 --> 00:35:14,199
interested in have already started to

829
00:35:11,260 --> 00:35:16,150
contact us at NASA about how they can be

830
00:35:14,199 --> 00:35:19,149
involved in celebrating hubble's 25th

831
00:35:16,150 --> 00:35:21,039
anniversary so we're working on untying

832
00:35:19,150 --> 00:35:23,470
all those pieces together and really

833
00:35:21,039 --> 00:35:26,949
having a big celebration in the month of

834
00:35:23,469 --> 00:35:28,449
April in New York City so we did have

835
00:35:26,949 --> 00:35:32,710
something that has already happened in

836
00:35:28,449 --> 00:35:34,689
New York on New Year's Eve we had the

837
00:35:32,710 --> 00:35:36,789
Hubble video which I'll play for you in

838
00:35:34,690 --> 00:35:39,909
a few minutes it's a sort of a teaser

839
00:35:36,789 --> 00:35:41,710
video we had that played on a big

840
00:35:39,909 --> 00:35:43,480
Toshiba screen in Times Square on New

841
00:35:41,710 --> 00:35:45,579

Year's Eve where there were so many

842

00:35:43,480 --> 00:35:48,880

people gathered there and Mike Massimino

843

00:35:45,579 --> 00:35:49,989

gave a little a little short talk on the

844

00:35:48,880 --> 00:35:52,480

webcast of the New Year's Eve

845

00:35:49,989 --> 00:35:55,329

celebration so we've already had a

846

00:35:52,480 --> 00:35:57,309

really a really good a good event happen

847

00:35:55,329 --> 00:35:59,949

in New York City and we're looking

848

00:35:57,309 --> 00:36:03,549

forward to other events in the coming

849

00:35:59,949 --> 00:36:05,829

several months so in addition to New

850

00:36:03,550 --> 00:36:12,310

York there are of course museums

851

00:36:05,829 --> 00:36:14,019

planetary accretion events and in

852

00:36:12,309 --> 00:36:16,389

particular I mentioned the intrepid

853

00:36:14,019 --> 00:36:18,909

museum in New York City has already

854

00:36:16,389 --> 00:36:22,329

opened up in October an event dedicated

855

00:36:18,909 --> 00:36:23,559

to to the Hubble 25th anniversary so the

856
00:36:22,329 --> 00:36:25,000
next time you're in New York check that

857
00:36:23,559 --> 00:36:27,820
out it's a really beautiful exhibit

858
00:36:25,000 --> 00:36:30,760
it'll be up through next fall there was

859
00:36:27,820 --> 00:36:33,070
a panel there in October with the in

860
00:36:30,760 --> 00:36:34,680
November with the servicing mission for

861
00:36:33,070 --> 00:36:37,480
astronauts that was really well attended

862
00:36:34,679 --> 00:36:42,460
and that was also videoed and replayed

863
00:36:37,480 --> 00:36:44,409
on NASA TV and of course will work with

864
00:36:42,460 --> 00:36:47,440
NASA headquarters office of legislative

865
00:36:44,409 --> 00:36:49,980
and Inter government affairs and our

866
00:36:47,440 --> 00:36:53,079
industry partners to engage all our

867
00:36:49,980 --> 00:36:54,730
external stakeholders in in a lot of the

868
00:36:53,079 --> 00:36:56,079
events that they already do so the NASA

869
00:36:54,730 --> 00:36:58,420
day on the hill and those sorts of

870
00:36:56,079 --> 00:37:01,119
events so we have we're working with

871
00:36:58,420 --> 00:37:05,289
with them to to plan those things as

872
00:37:01,119 --> 00:37:07,000
well one really great way to reach out

873
00:37:05,289 --> 00:37:09,429
to some of the non-traditional audiences

874
00:37:07,000 --> 00:37:10,309
I mentioned is and these big public

875
00:37:09,429 --> 00:37:11,779
events that happen

876
00:37:10,309 --> 00:37:14,299
so one good example is South by

877
00:37:11,780 --> 00:37:16,700
Southwest down in Austin and that

878
00:37:14,300 --> 00:37:18,500
happens every March so the last few

879
00:37:16,699 --> 00:37:20,210
years NASA's had a very big presence at

880
00:37:18,500 --> 00:37:22,250
South by Southwest and this is an

881
00:37:20,210 --> 00:37:24,500
audience that is very tech interested

882
00:37:22,250 --> 00:37:26,570
but not necessarily space interested and

883
00:37:24,500 --> 00:37:28,760
so they love it when we show up with

884

00:37:26,570 --> 00:37:30,920
NASA stuff at South by Southwest and so

885
00:37:28,760 --> 00:37:33,290
we're going back again this year we have

886
00:37:30,920 --> 00:37:35,960
a panel in the interactive session on

887
00:37:33,289 --> 00:37:39,380
Hubble 25th and John Grunsfeld is on

888
00:37:35,960 --> 00:37:41,150
that panel and we have a big NASA

889
00:37:39,380 --> 00:37:42,860
exhibit that we're gonna have Hubble

890
00:37:41,150 --> 00:37:46,099
25th Clinton out we're going to take the

891
00:37:42,860 --> 00:37:48,800
big the Andromeda mosaic down to that so

892
00:37:46,099 --> 00:37:50,329
a lot of really exciting things for

893
00:37:48,800 --> 00:37:51,740
different large festivals that happen

894
00:37:50,329 --> 00:37:53,329
across the country and I already

895
00:37:51,739 --> 00:37:55,759
mentioned in World Science Festival and

896
00:37:53,329 --> 00:37:57,049
there are several other sort of events

897
00:37:55,760 --> 00:38:01,240
like that across the country that we're

898
00:37:57,050 --> 00:38:05,030

going to be doing over the next year

899

00:38:01,239 --> 00:38:08,079

we're excited to have secured exhibits

900

00:38:05,030 --> 00:38:11,720

in the Dulles and Reagan airports and

901

00:38:08,079 --> 00:38:13,519

this is just some some concepts of what

902

00:38:11,719 --> 00:38:16,549

that might look like and we're also

903

00:38:13,519 --> 00:38:18,889

reaching out to BWI and to some other

904

00:38:16,550 --> 00:38:20,320

airports across the country as well and

905

00:38:18,889 --> 00:38:22,730

Space Telescope is leading that effort

906

00:38:20,320 --> 00:38:24,530

but so when next time you fly through

907

00:38:22,730 --> 00:38:27,199

one of these major airports look out for

908

00:38:24,530 --> 00:38:29,120

Hubble cuz it'll be there there'll be a

909

00:38:27,199 --> 00:38:31,189

nationwide University lecture series

910

00:38:29,119 --> 00:38:33,920

going on I through the month of April

911

00:38:31,190 --> 00:38:36,139

and we're still working on that slide

912

00:38:33,920 --> 00:38:38,930

deck for that and so um get in touch

913
00:38:36,139 --> 00:38:41,389
with us to get to get slides to get

914
00:38:38,929 --> 00:38:44,929
support material for that of course the

915
00:38:41,389 --> 00:38:47,569
Hubble 2020 I'm symposium and that's

916
00:38:44,929 --> 00:38:49,579
coming up in April and then really just

917
00:38:47,570 --> 00:38:51,440
some other events of course double yes

918
00:38:49,579 --> 00:38:53,889
so we're at right now and other

919
00:38:51,440 --> 00:38:57,019
scientific meetings throughout the year

920
00:38:53,889 --> 00:38:58,759
Space Telescope again has a excellent

921
00:38:57,019 --> 00:39:01,190
team that's doing formal and informal

922
00:38:58,760 --> 00:39:03,770
education and so there's a whole host of

923
00:39:01,190 --> 00:39:05,869
education programs going on throughout

924
00:39:03,769 --> 00:39:08,239
the year that all focus on on Hubble

925
00:39:05,869 --> 00:39:11,089
25th I've already mentioned several

926
00:39:08,239 --> 00:39:15,349
times we have an extensive traditional

927
00:39:11,090 --> 00:39:18,530
and social media outreach plan we have a

928
00:39:15,349 --> 00:39:19,969
really a willing audience on social

929
00:39:18,530 --> 00:39:22,700
media and so we really hope to leverage

930
00:39:19,969 --> 00:39:23,569
all our different accounts the at NASA

931
00:39:22,699 --> 00:39:25,339
Twitter

932
00:39:23,570 --> 00:39:28,480
has eight and a half million followers

933
00:39:25,340 --> 00:39:30,860
just to give you an example and so we

934
00:39:28,480 --> 00:39:33,199
will work with all of the different

935
00:39:30,860 --> 00:39:35,990
partners and our corporate partners to

936
00:39:33,199 --> 00:39:38,359
just to really have a really consistent

937
00:39:35,989 --> 00:39:40,099
year-long presence on social media

938
00:39:38,360 --> 00:39:42,710
Twitter Facebook and all the other

939
00:39:40,099 --> 00:39:44,929
platforms and then the traditional media

940
00:39:42,710 --> 00:39:48,679
of course is also I'm a key part of this

941

00:39:44,929 --> 00:39:50,690
we there will be helpful 25th specials

942
00:39:48,679 --> 00:39:52,759
on National Geographic and Nova is also

943
00:39:50,690 --> 00:39:54,769
doing a documentary I already mentioned

944
00:39:52,760 --> 00:39:58,910
that um the Hubble 3d will be released

945
00:39:54,769 --> 00:40:01,630
on IMAX and then ISA is leading an

946
00:39:58,909 --> 00:40:04,009
effort to to get planetarium shorts

947
00:40:01,630 --> 00:40:07,579
distributed throughout throughout Europe

948
00:40:04,010 --> 00:40:09,020
and also throughout the US so that is

949
00:40:07,579 --> 00:40:10,819
another really exciting thing that will

950
00:40:09,019 --> 00:40:13,309
be happening across the planet area

951
00:40:10,820 --> 00:40:15,769
across the country and then Space

952
00:40:13,309 --> 00:40:17,090
Telescope is also doing three minute

953
00:40:15,769 --> 00:40:18,500
videos that they're going to be

954
00:40:17,090 --> 00:40:20,750
releasing every month and the preview

955
00:40:18,500 --> 00:40:22,760

for that sorry yacht so be looking for

956

00:40:20,750 --> 00:40:24,590

that one thing I haven't actually put in

957

00:40:22,760 --> 00:40:26,630

my slides but the place where you can go

958

00:40:24,590 --> 00:40:29,210

to find all of this information that

959

00:40:26,630 --> 00:40:30,800

will be constantly updated is a website

960

00:40:29,210 --> 00:40:33,500

that we have dedicated to the to the

961

00:40:30,800 --> 00:40:36,530

25th and that's Hubble 25th org so it's

962

00:40:33,500 --> 00:40:39,260

Hubble - 5 th org and so all of this

963

00:40:36,530 --> 00:40:42,230

information and ways to get involved for

964

00:40:39,260 --> 00:40:44,570

free for you you all to get involved in

965

00:40:42,230 --> 00:40:45,590

this will be available there and of

966

00:40:44,570 --> 00:40:46,190

course you can always get in touch with

967

00:40:45,590 --> 00:40:50,450

any of us

968

00:40:46,190 --> 00:40:52,760

to find out details as well so I'm gonna

969

00:40:50,449 --> 00:40:54,859

leave you with the the video that the

970
00:40:52,760 --> 00:40:57,800
NASA TV folks at headquarters um made

971
00:40:54,860 --> 00:40:59,570
for us just a couple months ago and I'm

972
00:40:57,800 --> 00:41:02,470
gonna go and play that now and finish

973
00:40:59,570 --> 00:41:02,470
processes sound works

974
00:42:16,849 --> 00:42:22,170
thank you to our speakers for these

975
00:42:19,800 --> 00:42:24,090
great presentations and now if you we

976
00:42:22,170 --> 00:42:26,820
have a couple of minutes if you'd like

977
00:42:24,090 --> 00:42:32,190
to ask a question please make your way

978
00:42:26,820 --> 00:42:33,809
to a microphone and think not only of a

979
00:42:32,190 --> 00:42:36,000
question that you'd like to ask but

980
00:42:33,809 --> 00:42:38,239
maybe somebody out there in the

981
00:42:36,000 --> 00:42:41,159
community who'd like to ask a question

982
00:42:38,239 --> 00:42:43,829
and you can do that on behalf of them so

983
00:42:41,159 --> 00:42:44,489
that when we play this back they'll have

984
00:42:43,829 --> 00:42:50,880
the answer

985
00:42:44,489 --> 00:42:53,489
anybody don't be shy okay we've got a

986
00:42:50,880 --> 00:42:56,190
very shy audience okay great Martin

987
00:42:53,489 --> 00:42:58,379
thanks you Carol thanks oh is that the

988
00:42:56,190 --> 00:42:59,610
science right a meeting there was done

989
00:42:58,380 --> 00:43:02,340
yesterday and I was kind of curious

990
00:42:59,610 --> 00:43:04,920
there was a an omission and I'm kind of

991
00:43:02,340 --> 00:43:07,170
curious what is happening with cus

992
00:43:04,920 --> 00:43:09,000
that's such a powerful instrument

993
00:43:07,170 --> 00:43:12,510
there's a lot of science and interesting

994
00:43:09,000 --> 00:43:14,280
stories coming out could somebody tell

995
00:43:12,510 --> 00:43:17,070
us something about the cosmic origins

996
00:43:14,280 --> 00:43:23,640
spectrograph for for promote you know

997
00:43:17,070 --> 00:43:24,900
telling what Hubble is doing you'd like

998

00:43:23,639 --> 00:43:26,549
to hear about what kind of science is

999
00:43:24,900 --> 00:43:29,610
coming out is that the is that the

1000
00:43:26,550 --> 00:43:32,430
question or is when was installed there

1001
00:43:29,610 --> 00:43:35,250
was a lot of interest in what it was

1002
00:43:32,429 --> 00:43:38,579
going to do but most of the public stuff

1003
00:43:35,250 --> 00:43:40,769
that is out there is imagery right right

1004
00:43:38,579 --> 00:43:43,139
but I'm wondering if there are stories

1005
00:43:40,769 --> 00:43:45,179
in there for science writers or

1006
00:43:43,139 --> 00:43:46,650
communicators like me and planetariums

1007
00:43:45,179 --> 00:43:51,269
and things that we can really highlight

1008
00:43:46,650 --> 00:43:52,139
yes the race person because advocate of

1009
00:43:51,269 --> 00:43:54,869
the conflict

1010
00:43:52,139 --> 00:43:56,969
yeah I'm spectroscopy is by training so

1011
00:43:54,869 --> 00:43:59,029
that's a it's an instrument that's near

1012
00:43:56,969 --> 00:44:01,409

and dear to my heart

1013

00:43:59,030 --> 00:44:04,140
cost is touching all kinds of

1014

00:44:01,409 --> 00:44:07,069
interesting subjects we've had several

1015

00:44:04,139 --> 00:44:09,960
large programs over the past few years

1016

00:44:07,070 --> 00:44:12,690
devoted to understanding

1017

00:44:09,960 --> 00:44:14,159
material out of which galaxies form the

1018

00:44:12,690 --> 00:44:16,858
circum Galactic medium and the

1019

00:44:14,159 --> 00:44:20,069
intergalactic medium and there's great

1020

00:44:16,858 --> 00:44:22,259
stories there about how you know this

1021

00:44:20,070 --> 00:44:26,519
the universe evolves and that structure

1022

00:44:22,260 --> 00:44:29,220
out of which galaxies forms on which

1023

00:44:26,519 --> 00:44:32,969
galaxies form evolves you've probably

1024

00:44:29,219 --> 00:44:35,368
seen some of that the the press update

1025

00:44:32,969 --> 00:44:37,649
that Andrew Fox gave on Monday was just

1026

00:44:35,369 --> 00:44:39,809
a little snippet of that and there's a

1027
00:44:37,650 --> 00:44:42,300
much bigger picture there much bigger

1028
00:44:39,809 --> 00:44:45,838
context cost is doing really great

1029
00:44:42,300 --> 00:44:47,730
things in the exoplanet area in the

1030
00:44:45,838 --> 00:44:50,880
looking at the atmospheres of exoplanets

1031
00:44:47,730 --> 00:44:54,570
and detecting heavy elements and

1032
00:44:50,880 --> 00:44:58,108
different kinds of species in the plan

1033
00:44:54,570 --> 00:45:01,890
planets that are essentially evaporating

1034
00:44:58,108 --> 00:45:06,679
these hot Jupiters there's lots of

1035
00:45:01,889 --> 00:45:09,779
interest in observations of hot stars

1036
00:45:06,679 --> 00:45:12,809
active galactic nuclei material

1037
00:45:09,780 --> 00:45:16,019
funneling into black holes just about

1038
00:45:12,809 --> 00:45:18,690
every area that you can think of causes

1039
00:45:16,019 --> 00:45:21,300
touching in some ways it's unfortunate

1040
00:45:18,690 --> 00:45:24,720
that oftentimes because of the

1041
00:45:21,300 --> 00:45:27,510
spectroscopic result it doesn't get put

1042
00:45:24,719 --> 00:45:31,739
into a context that's easy for the

1043
00:45:27,510 --> 00:45:33,510
public to understand and i'm carol knows

1044
00:45:31,739 --> 00:45:34,949
this i keep bugging her about this and

1045
00:45:33,510 --> 00:45:37,349
our other folks in our office of public

1046
00:45:34,949 --> 00:45:40,588
outreach to you know to try and make

1047
00:45:37,349 --> 00:45:42,450
that case better make it easier for you

1048
00:45:40,588 --> 00:45:44,460
and other science writers out there to

1049
00:45:42,449 --> 00:45:46,919
convey those interesting science results

1050
00:45:44,460 --> 00:45:49,588
so one of the things that we've started

1051
00:45:46,920 --> 00:45:52,980
doing is including some of the spectra

1052
00:45:49,588 --> 00:45:54,719
from costs and cysts in the material

1053
00:45:52,980 --> 00:45:56,300
that we release with press releases and

1054
00:45:54,719 --> 00:45:58,529
we're going to continue to do that

1055

00:45:56,300 --> 00:46:01,769
that's incredibly important because

1056
00:45:58,530 --> 00:46:02,849
James Webb is a spectroscopic machine

1057
00:46:01,769 --> 00:46:04,170
right

1058
00:46:02,849 --> 00:46:06,000
it will certainly produce beautiful

1059
00:46:04,170 --> 00:46:08,880
images but it's going to produce a

1060
00:46:06,000 --> 00:46:10,170
boatload of spectroscopy and most of its

1061
00:46:08,880 --> 00:46:13,500
science is going to be spectroscopy

1062
00:46:10,170 --> 00:46:15,480
related so thanks for asking that

1063
00:46:13,500 --> 00:46:18,030
question I'd be happy to talk with you

1064
00:46:15,480 --> 00:46:21,088
more individually one on one about some

1065
00:46:18,030 --> 00:46:22,720
specific suggestions and now that you've

1066
00:46:21,088 --> 00:46:24,909
asked that question I'm going

1067
00:46:22,719 --> 00:46:28,059
I'm gonna be emailing you and your

1068
00:46:24,909 --> 00:46:30,429
colleagues about how to help us convey

1069
00:46:28,059 --> 00:46:31,869

that information because you know we

1070

00:46:30,429 --> 00:46:34,269
often get these results and we're

1071

00:46:31,869 --> 00:46:36,220
working with the scientist to get their

1072

00:46:34,269 --> 00:46:39,099
results forward but we do need to be

1073

00:46:36,219 --> 00:46:40,480
able to convey that information to the

1074

00:46:39,099 --> 00:46:45,820
public so we have a question here and

1075

00:46:40,480 --> 00:46:49,289
then a question here so was launched I I

1076

00:46:45,820 --> 00:46:51,789
was about learning to read or write but

1077

00:46:49,289 --> 00:46:53,529
and I understand that I mean some

1078

00:46:51,789 --> 00:46:57,009
instruments and Hubble have been changed

1079

00:46:53,530 --> 00:46:58,810
but the things Hubble has Hubble has

1080

00:46:57,010 --> 00:47:02,920
apparently done very well in the past is

1081

00:46:58,809 --> 00:47:05,619
images but they'd say visit Gemini

1082

00:47:02,920 --> 00:47:08,559
planet image and so ground-based AO has

1083

00:47:05,619 --> 00:47:11,079
caught up almost called a plus Apple do

1084
00:47:08,559 --> 00:47:13,840
you see it trained to spectroscopy or

1085
00:47:11,079 --> 00:47:15,309
trained to UV in the proposals which are

1086
00:47:13,840 --> 00:47:17,410
areas where there's no ground-based

1087
00:47:15,309 --> 00:47:22,119
machine or no ground-based telescope

1088
00:47:17,409 --> 00:47:29,139
they'll ever be able to do that it's

1089
00:47:22,119 --> 00:47:31,869
it's certainly it's certainly good to

1090
00:47:29,139 --> 00:47:33,400
encourage things that you know people to

1091
00:47:31,869 --> 00:47:35,470
propose only things that Hubble can do

1092
00:47:33,400 --> 00:47:37,000
and like you said UV spectroscopy of

1093
00:47:35,469 --> 00:47:38,289
things of that nature is something that

1094
00:47:37,000 --> 00:47:40,630
only Hubble can do and when Hubble is

1095
00:47:38,289 --> 00:47:42,539
gone there won't be a resource at least

1096
00:47:40,630 --> 00:47:44,829
in the near term future to do that

1097
00:47:42,539 --> 00:47:47,079
Hubble is still extremely competitive

1098
00:47:44,829 --> 00:47:49,170
with even 8 and 10 meter telescopes on

1099
00:47:47,079 --> 00:47:54,329
the ground from an imaging standpoint

1100
00:47:49,170 --> 00:47:57,849
both from a resolution and sensitivity

1101
00:47:54,329 --> 00:47:59,949
standpoint but also from a grism

1102
00:47:57,849 --> 00:48:02,490
spectroscopy standpoint Wide Field

1103
00:47:59,949 --> 00:48:05,079
Camera 3 Grissom's

1104
00:48:02,489 --> 00:48:06,848
we can go deeper with those grism zan

1105
00:48:05,079 --> 00:48:11,559
you can possibly go from the ground now

1106
00:48:06,849 --> 00:48:14,619
that era to will end with the advent of

1107
00:48:11,559 --> 00:48:16,420
extremely large telescopes but for now

1108
00:48:14,619 --> 00:48:18,670
in at least the next couple years Hubble

1109
00:48:16,420 --> 00:48:21,550
should be very competitive with

1110
00:48:18,670 --> 00:48:22,659
ground-based observatories synergistic

1111
00:48:21,550 --> 00:48:26,230
certainly with some of the things that

1112

00:48:22,659 --> 00:48:30,750
Alma is doing and still have you know a

1113
00:48:26,230 --> 00:48:34,300
lot of discovery space available to it

1114
00:48:30,750 --> 00:48:35,409
yes your question thanks I'm Gregg

1115
00:48:34,300 --> 00:48:36,059
running from the University of Kansas

1116
00:48:35,409 --> 00:48:38,009
and

1117
00:48:36,059 --> 00:48:39,298
I want to ask a question about the

1118
00:48:38,009 --> 00:48:41,309
celebrations are at the 25th anniversary

1119
00:48:39,298 --> 00:48:44,969
I mean many of the activities are New

1120
00:48:41,309 --> 00:48:47,219
York City Washington area airports but

1121
00:48:44,969 --> 00:48:50,429
there is a distributed interest across

1122
00:48:47,219 --> 00:48:52,108
the entire country and so I was my

1123
00:48:50,429 --> 00:48:53,788
interest was piqued partly by your

1124
00:48:52,108 --> 00:48:54,688
University lecture series so I'd like to

1125
00:48:53,789 --> 00:48:57,479
hear a little bit more about what that

1126
00:48:54,688 --> 00:48:59,458

is but I also like to hear about what

1127

00:48:57,478 --> 00:49:04,739

kind of efforts are there to extend the

1128

00:48:59,458 --> 00:49:06,629

celebrations to institutions for example

1129

00:49:04,739 --> 00:49:07,739

all across the country for us so for

1130

00:49:06,630 --> 00:49:10,108

example one of the largest amateur

1131

00:49:07,739 --> 00:49:12,838

astronomy organizations in the country

1132

00:49:10,108 --> 00:49:15,028

is in Kansas City there are astronauts

1133

00:49:12,838 --> 00:49:16,739

spread all around the country we have a

1134

00:49:15,028 --> 00:49:18,748

few in Kansas Steve Hall is actually

1135

00:49:16,739 --> 00:49:21,028

offices next to mine so you know I'm

1136

00:49:18,748 --> 00:49:22,919

curious what efforts throw out to tap

1137

00:49:21,028 --> 00:49:24,599

into those resources or well all those

1138

00:49:22,920 --> 00:49:27,088

people be flying to DC I mean you know

1139

00:49:24,599 --> 00:49:30,599

for the anniversary and so we'll miss

1140

00:49:27,088 --> 00:49:34,619

that opportunity so I mentioned this one

1141
00:49:30,599 --> 00:49:35,880
yeah I mentioned the the event on April

1142
00:49:34,619 --> 00:49:39,869
24th that we're doing will be webcast

1143
00:49:35,880 --> 00:49:42,719
and we have someone that is going to be

1144
00:49:39,869 --> 00:49:45,088
like the point person for coordinating

1145
00:49:42,719 --> 00:49:46,619
and helping to distribute materials and

1146
00:49:45,088 --> 00:49:50,400
information to sort of host their own

1147
00:49:46,619 --> 00:49:53,809
celebrations that day so she has a list

1148
00:49:50,400 --> 00:49:56,639
of 200 you know science centers

1149
00:49:53,809 --> 00:49:59,849
planetary it's more focused on sort of

1150
00:49:56,639 --> 00:50:02,038
museums but also the University lecture

1151
00:49:59,849 --> 00:50:03,959
series is they'll be going on during

1152
00:50:02,039 --> 00:50:05,729
during that month that you mentioned

1153
00:50:03,958 --> 00:50:08,669
that's also a great way to get involved

1154
00:50:05,728 --> 00:50:12,509
so the the website that I mentioned will

1155
00:50:08,670 --> 00:50:15,179
will soon be hosting you know materials

1156
00:50:12,509 --> 00:50:17,130
that you can go and download or use and

1157
00:50:15,179 --> 00:50:18,900
then we'll also find ways to facilitate

1158
00:50:17,130 --> 00:50:23,039
you know sending materials to people who

1159
00:50:18,900 --> 00:50:24,269
want to do things so those those things

1160
00:50:23,039 --> 00:50:27,839
are definitely being planned

1161
00:50:24,268 --> 00:50:31,498
so anyone it can get in touch with us

1162
00:50:27,838 --> 00:50:33,900
for for help and for materials to to

1163
00:50:31,498 --> 00:50:36,058
sort of you know make your own sort of

1164
00:50:33,900 --> 00:50:38,789
celebration and we're working closely

1165
00:50:36,059 --> 00:50:40,890
with the astronaut office at NASA in

1166
00:50:38,789 --> 00:50:42,900
order to like you said to to sort of

1167
00:50:40,889 --> 00:50:44,308
take advantage of the fact that a lot of

1168
00:50:42,900 --> 00:50:46,019
the Hubble astronauts are sort of spread

1169

00:50:44,309 --> 00:50:47,189
out across the country so yeah we're

1170
00:50:46,018 --> 00:50:48,899
definitely we're definitely thinking

1171
00:50:47,188 --> 00:50:49,409
about those things but but yeah get in

1172
00:50:48,900 --> 00:50:51,690
touch

1173
00:50:49,409 --> 00:50:55,048
after the fact if you want more details

1174
00:50:51,690 --> 00:50:57,298
are to be you know to lead an event or

1175
00:50:55,048 --> 00:51:00,869
anything like that thanks very much

1176
00:50:57,298 --> 00:51:03,778
thank you question over here like your I

1177
00:51:00,869 --> 00:51:05,489
liked your slide on the status of Hubble

1178
00:51:03,778 --> 00:51:07,349
and in the fact that the gyro was

1179
00:51:05,489 --> 00:51:09,630
weren't going to be a foreseeable issue

1180
00:51:07,349 --> 00:51:13,440
but I heard from a friend of an engineer

1181
00:51:09,630 --> 00:51:15,390
that the the most critical component are

1182
00:51:13,440 --> 00:51:17,309
the one that that is they're most

1183
00:51:15,389 --> 00:51:19,048

concerned about is actually the solar

1184

00:51:17,309 --> 00:51:21,359
panels but I didn't see that on your

1185

00:51:19,048 --> 00:51:24,028
slide and that I'm hearing correctly

1186

00:51:21,358 --> 00:51:27,028
from my friend of the engineer or can

1187

00:51:24,028 --> 00:51:29,969
you give me an update on that at the

1188

00:51:27,028 --> 00:51:31,440
moment the electrical system on Hubble

1189

00:51:29,969 --> 00:51:33,899
is extremely good

1190

00:51:31,440 --> 00:51:38,190
I know of no issues with the solar

1191

00:51:33,900 --> 00:51:41,068
panels the solar panels do slowly

1192

00:51:38,190 --> 00:51:43,619
degrade with time we have not had any

1193

00:51:41,068 --> 00:51:46,498
issues with them in the last five years

1194

00:51:43,619 --> 00:51:48,869
or so the amount of power that they're

1195

00:51:46,498 --> 00:51:52,018
able to produce is declining with time

1196

00:51:48,869 --> 00:51:53,700
but it's not declining rapidly enough

1197

00:51:52,018 --> 00:51:58,649
that we would have to shut off an

1198
00:51:53,699 --> 00:51:59,909
instrument say honestly I think unless

1199
00:51:58,650 --> 00:52:04,108
there's some kind of a catastrophic

1200
00:51:59,909 --> 00:52:06,149
failure or meteorite hit or some kind of

1201
00:52:04,108 --> 00:52:07,978
catastrophic electrical failure that the

1202
00:52:06,150 --> 00:52:10,619
solar panels are not an issue it'd be

1203
00:52:07,978 --> 00:52:24,149
interesting to know exactly what your

1204
00:52:10,619 --> 00:52:29,400
engineer friend was thinking about very

1205
00:52:24,150 --> 00:52:34,829
same question Wow no problem with the

1206
00:52:29,400 --> 00:52:35,639
solar panels batteries batteries are in

1207
00:52:34,829 --> 00:52:38,960
really good shape

1208
00:52:35,639 --> 00:52:41,909
we've got about 500 amp hours a charge

1209
00:52:38,960 --> 00:52:46,139
capability with those now that's still

1210
00:52:41,909 --> 00:52:48,328
up well above what we need and so they

1211
00:52:46,139 --> 00:52:49,650
were they were replaced during the

1212
00:52:48,329 --> 00:52:53,999
servicing mission as well and they're

1213
00:52:49,650 --> 00:52:55,979
performing beautifully well let's thank

1214
00:52:53,998 --> 00:52:58,318
our speakers again and thank you for

1215
00:52:55,978 --> 00:53:03,298
coming to the town hall

1216
00:52:58,318 --> 00:53:05,759
oh we have one more question sorry so I

1217
00:53:03,298 --> 00:53:08,179
think it was a few months ago that a

1218
00:53:05,759 --> 00:53:11,639
very interesting paper by Neil Reed

1219
00:53:08,179 --> 00:53:14,788
appeared in a strop eh and I'm just

1220
00:53:11,639 --> 00:53:16,978
wondering if anything is being done to

1221
00:53:14,789 --> 00:53:19,469
mitigate the problem that he pointed out

1222
00:53:16,978 --> 00:53:23,038
exists statistically in the proposal

1223
00:53:19,469 --> 00:53:25,920
reviews sure I'll I'll take that I'm

1224
00:53:23,039 --> 00:53:29,069
part of the science mission office so

1225
00:53:25,920 --> 00:53:31,979
the the study that the speaker's is

1226

00:53:29,068 --> 00:53:34,619
referring to was an analysis of the

1227
00:53:31,978 --> 00:53:38,248
success rates of female and male PI's

1228
00:53:34,619 --> 00:53:40,680
over the history of HSTs tack process

1229
00:53:38,248 --> 00:53:44,848
and every year there is a very very

1230
00:53:40,679 --> 00:53:46,969
small but but really there difference in

1231
00:53:44,849 --> 00:53:49,680
that women pis are underrepresented

1232
00:53:46,969 --> 00:53:52,349
relative to the male PI's and when you

1233
00:53:49,679 --> 00:53:54,149
add that up over you know the 20 or so

1234
00:53:52,349 --> 00:53:56,459
tax it becomes apparent that this is a

1235
00:53:54,150 --> 00:53:59,430
real trend this happens every single

1236
00:53:56,458 --> 00:54:01,708
year so we're we're aware of the problem

1237
00:53:59,429 --> 00:54:04,649
we don't really know how to fix this

1238
00:54:01,708 --> 00:54:10,618
last year we tried an experiment where

1239
00:54:04,650 --> 00:54:13,588
we removed we took the names of the pis

1240
00:54:10,619 --> 00:54:15,150

we only included the first initial so

1241
00:54:13,588 --> 00:54:17,578
that people didn't necessarily know

1242
00:54:15,150 --> 00:54:20,130
whether it was a male or female PI we

1243
00:54:17,579 --> 00:54:22,589
also put the names on a second page and

1244
00:54:20,130 --> 00:54:25,680
we labeled the proposals by number not

1245
00:54:22,588 --> 00:54:28,548
name and we instructed people to discuss

1246
00:54:25,679 --> 00:54:30,568
the proposal and not who the PI's were

1247
00:54:28,548 --> 00:54:32,818
that didn't seem to make a big

1248
00:54:30,568 --> 00:54:34,920
difference so will we're going to

1249
00:54:32,818 --> 00:54:37,558
continue to investigate this problem the

1250
00:54:34,920 --> 00:54:39,630
other thing that we do during the at the

1251
00:54:37,559 --> 00:54:41,910
start of each attack during the

1252
00:54:39,630 --> 00:54:44,759
orientation that we remind people about

1253
00:54:41,909 --> 00:54:46,649
the issue of unconscious bias and make

1254
00:54:44,759 --> 00:54:48,208
sure that all the panelists and the takt

1255
00:54:46,650 --> 00:54:50,989
chairs are aware that this is a real

1256
00:54:48,208 --> 00:54:54,208
issue in when you're discussing

1257
00:54:50,989 --> 00:54:57,509
proposals and and female versus male pis

1258
00:54:54,208 --> 00:55:04,469
but you know we're aware we're doing the

1259
00:54:57,509 --> 00:55:06,239
best that we can I would say is there a

1260
00:55:04,469 --> 00:55:10,139
new study that's going to be done about

1261
00:55:06,239 --> 00:55:12,059
whether there's institutional bias you

1262
00:55:10,139 --> 00:55:14,609
mean at the level of

1263
00:55:12,059 --> 00:55:16,650
can you ask about can you clarify I can

1264
00:55:14,610 --> 00:55:23,010
clarify that because I was at an

1265
00:55:16,650 --> 00:55:25,710
institution 16 years ago and one year I

1266
00:55:23,010 --> 00:55:27,930
submitted three Hubble proposals and I

1267
00:55:25,710 --> 00:55:30,059
had three Hubble proposals accepted

1268
00:55:27,929 --> 00:55:32,789
which was excellent I then moved to a

1269
00:55:30,059 --> 00:55:35,210
much larger institution and since then

1270
00:55:32,789 --> 00:55:38,340
my success rate has gone down

1271
00:55:35,210 --> 00:55:41,639
significantly and I'm just you know it

1272
00:55:38,340 --> 00:55:43,890
just seemed very very peculiar that's

1273
00:55:41,639 --> 00:55:46,079
that's we can look into that we I don't

1274
00:55:43,889 --> 00:55:47,969
know that we have done that study of

1275
00:55:46,079 --> 00:55:49,590
large versus small institutions but

1276
00:55:47,969 --> 00:55:53,039
that's something that I think the idea

1277
00:55:49,590 --> 00:55:54,870
to look at okay thank you I will say

1278
00:55:53,039 --> 00:55:58,469
that I'm on a proposal studying

1279
00:55:54,869 --> 00:56:01,440
Westerlund too and it's all women sort

1280
00:55:58,469 --> 00:56:04,679
of not by accident but we did get the

1281
00:56:01,440 --> 00:56:06,929
time so and we're coming out pretty soon

1282
00:56:04,679 --> 00:56:10,019
with some pretty impressive results so

1283

00:56:06,929 --> 00:56:15,230
anyway again thank you all and have a

1284
00:56:10,019 --> 00:56:15,230
good afternoon thank you