
NASA
SPACESTATION
LIVE

1
00:00:08,710 --> 00:00:06,389
the international space station is used

2
00:00:10,870 --> 00:00:08,720
as a research laboratory on orbit and

3
00:00:12,789 --> 00:00:10,880
also as a means to encourage students in

4
00:00:15,589 --> 00:00:12,799
their studies of science technology

5
00:00:18,390 --> 00:00:15,599
engineering and math recently the center

6
00:00:20,710 --> 00:00:18,400
for the advancement of science and space

7
00:00:22,470 --> 00:00:20,720
the nonprofit that manages the iss

8
00:00:24,230 --> 00:00:22,480
national laboratory partnered with a

9
00:00:26,390 --> 00:00:24,240
number of companies to develop a

10
00:00:29,269 --> 00:00:26,400
competition for students from the 7th to

11
00:00:31,429 --> 00:00:29,279
12th grades to design an experiment to

12
00:00:34,150 --> 00:00:31,439
fly on the station the results of that

13
00:00:36,870 --> 00:00:34,160

competition called genes in space is on

14
00:00:39,110 --> 00:00:36,880
space station right now recently my

15
00:00:41,750 --> 00:00:39,120
colleague gary jordan spoke with the

16
00:00:43,350 --> 00:00:41,760
program manager scott copeland of boeing

17
00:00:45,190 --> 00:00:43,360
here in houston and started by asking

18
00:00:46,229 --> 00:00:45,200
where the idea for this experiment came

19
00:00:48,310 --> 00:00:46,239
from

20
00:00:50,950 --> 00:00:48,320
well boeing is celebrating their 100

21
00:00:53,029 --> 00:00:50,960
year anniversary of being in business so

22
00:00:55,189 --> 00:00:53,039
we certainly want to encourage young men

23
00:00:57,270 --> 00:00:55,199
and women to continue their education

24
00:00:59,510 --> 00:00:57,280
with science technology engineering and

25
00:01:01,990 --> 00:00:59,520
math while we were participating in the

26
00:01:04,310 --> 00:01:02,000
mass challenge with cases last year i

27
00:01:07,830 --> 00:01:04,320
ran across a company that had a little

28
00:01:10,070 --> 00:01:07,840
dna replicator called the mini pcr

29
00:01:12,230 --> 00:01:10,080
so i found it interesting because the

30
00:01:15,429 --> 00:01:12,240
particular device is small it's very

31
00:01:16,550 --> 00:01:15,439
compact and uses very little resources

32
00:01:18,630 --> 00:01:16,560
so i thought it'd be a perfect

33
00:01:19,910 --> 00:01:18,640
application to put this on board the

34
00:01:22,390 --> 00:01:19,920
space station

35
00:01:23,830 --> 00:01:22,400
so as part of the discussions we ended

36
00:01:25,590 --> 00:01:23,840
up buying two of those units for

37
00:01:26,390 --> 00:01:25,600
evaluation purposes

38
00:01:28,390 --> 00:01:26,400

and then

39
00:01:30,230 --> 00:01:28,400
we had some follow-up discussions with

40
00:01:32,310 --> 00:01:30,240
the founders of their company

41
00:01:34,230 --> 00:01:32,320
and the company itself is very focused

42
00:01:35,830 --> 00:01:34,240
on stem education trying to put

43
00:01:38,069 --> 00:01:35,840
biotechnology

44
00:01:41,190 --> 00:01:38,079
devices and hardware into the school

45
00:01:43,109 --> 00:01:41,200
systems so that young women and men you

46
00:01:44,789 --> 00:01:43,119
know high school and junior high have

47
00:01:47,590 --> 00:01:44,799
access to this it's

48
00:01:49,109 --> 00:01:47,600
most schools even in anywhere in the us

49
00:01:51,109 --> 00:01:49,119
don't have access to that type of

50
00:01:52,789 --> 00:01:51,119
technology so because of that tell me

51
00:01:54,710 --> 00:01:52,799
about some of the response from the

52
00:01:56,950 --> 00:01:54,720
students and how that competition was

53
00:01:59,270 --> 00:01:56,960
judged well the response from both the

54
00:02:01,350 --> 00:01:59,280
students and the teachers has actually

55
00:02:03,590 --> 00:02:01,360
just been outstanding we've conducted

56
00:02:06,230 --> 00:02:03,600
workshops across the country where we

57
00:02:08,070 --> 00:02:06,240
did the simulations for example the last

58
00:02:09,990 --> 00:02:08,080
one we did was at the hudson alpha

59
00:02:12,630 --> 00:02:10,000
institute of technology in huntsville

60
00:02:14,550 --> 00:02:12,640
alabama we brought students and teachers

61
00:02:17,670 --> 00:02:14,560
into the classroom for a six to eight

62
00:02:19,670 --> 00:02:17,680
hour session we did a simulation for a

63
00:02:22,710 --> 00:02:19,680

contamination experiment

64
00:02:24,309 --> 00:02:22,720
we'd pre-staged food containers on the

65
00:02:26,309 --> 00:02:24,319
international space station for the

66
00:02:28,309 --> 00:02:26,319
ultimate journey to mars

67
00:02:30,470 --> 00:02:28,319
and we had a call up from the ground

68
00:02:32,790 --> 00:02:30,480
that warned us that one of the

69
00:02:34,869 --> 00:02:32,800
containers might have been contaminated

70
00:02:37,350 --> 00:02:34,879
and so we did the simulation let the

71
00:02:39,830 --> 00:02:37,360
students take dna samples and determine

72
00:02:41,990 --> 00:02:39,840
which container had been contaminated

73
00:02:44,150 --> 00:02:42,000
so it really got them engaged with

74
00:02:45,190 --> 00:02:44,160
hands-on workshop environments such as

75
00:02:48,309 --> 00:02:45,200
that

76
00:02:50,390 --> 00:02:48,319
excellent and your winner was a 17 year

77
00:02:52,390 --> 00:02:50,400
old from bedford new york

78
00:02:54,550 --> 00:02:52,400
so what are the goals of the research

79
00:02:56,309 --> 00:02:54,560
that she proposed

80
00:02:58,630 --> 00:02:56,319
well we really had two goals on this

81
00:03:00,869 --> 00:02:58,640
first we wanted to see if a

82
00:03:03,190 --> 00:03:00,879
what's called pcr polymerase chain

83
00:03:04,949 --> 00:03:03,200
reaction could be done in space so first

84
00:03:07,110 --> 00:03:04,959
thing we wanted to do was check out the

85
00:03:09,350 --> 00:03:07,120
experiment itself make sure the device

86
00:03:11,990 --> 00:03:09,360
would work in zero gravity

87
00:03:13,910 --> 00:03:12,000
and her experiment was focused on

88
00:03:15,910 --> 00:03:13,920

we know that the immune system from

89
00:03:18,390 --> 00:03:15,920
astronauts is compromised it's

90
00:03:20,149 --> 00:03:18,400
suppressed when but trying to we don't

91
00:03:22,949 --> 00:03:20,159
really know what's causing all of that

92
00:03:24,630 --> 00:03:22,959
at this point so she is looking at

93
00:03:26,789 --> 00:03:24,640
changes in the genetic

94
00:03:28,630 --> 00:03:26,799
makeup it changes the dna and see if she

95
00:03:31,030 --> 00:03:28,640
can determine a link between that and

96
00:03:33,350 --> 00:03:31,040
immune system suppression so how will

97
00:03:34,550 --> 00:03:33,360
genes in space be executed then uh in

98
00:03:36,550 --> 00:03:34,560
space

99
00:03:38,470 --> 00:03:36,560
well we've completed uh

100
00:03:39,990 --> 00:03:38,480
three sample runs to date so we're

101
00:03:43,110 --> 00:03:40,000
through and we're just waiting to bring

102
00:03:45,350 --> 00:03:43,120
our samples back we we extracted the dna

103
00:03:48,470 --> 00:03:45,360
from zebrafish using the laboratories at

104
00:03:51,030 --> 00:03:48,480
yale university the samples were

105
00:03:53,350 --> 00:03:51,040
pre-processed with the reagents and then

106
00:03:54,949 --> 00:03:53,360
packaged and frozen those were then

107
00:03:57,270 --> 00:03:54,959
shipped to the cape where they were

108
00:03:59,670 --> 00:03:57,280
launched to the station

109
00:04:01,990 --> 00:03:59,680
two weeks ago the first samples were

110
00:04:04,869 --> 00:04:02,000
taken out the mini pcr was set up in the

111
00:04:06,550 --> 00:04:04,879
node on the workbench area

112
00:04:08,470 --> 00:04:06,560
we checked it out the temperature

113
00:04:10,149 --> 00:04:08,480

profiles looked very good

114
00:04:13,190 --> 00:04:10,159
then we loaded the first sample which

115
00:04:15,190 --> 00:04:13,200
was anna sophia's sample

116
00:04:17,270 --> 00:04:15,200
it was processed and then returned back

117
00:04:19,909 --> 00:04:17,280
to cold storage and then we had two

118
00:04:22,310 --> 00:04:19,919
reference samples that were also

119
00:04:23,749 --> 00:04:22,320
processed so hopefully everything went

120
00:04:25,749 --> 00:04:23,759
well and we're looking forward to

121
00:04:27,350 --> 00:04:25,759
getting the samples back

122
00:04:29,030 --> 00:04:27,360
they'll be returned at the end of the

123
00:04:31,990 --> 00:04:29,040
month and

124
00:04:33,510 --> 00:04:32,000
we'll see what the results were

125
00:04:35,590 --> 00:04:33,520
so the results are coming how do you

126
00:04:37,590 --> 00:04:35,600
think the results of her experiment

127
00:04:39,189 --> 00:04:37,600
might be applied to support future space

128
00:04:41,430 --> 00:04:39,199
missions

129
00:04:43,510 --> 00:04:41,440
well i think this will open the door for

130
00:04:45,909 --> 00:04:43,520
us if we can look to see which genes

131
00:04:48,629 --> 00:04:45,919
have been turned on or off through this

132
00:04:50,310 --> 00:04:48,639
particular process called methylation if

133
00:04:52,629 --> 00:04:50,320
we can determine which ones have been

134
00:04:55,270 --> 00:04:52,639
turned on off that will open up the door

135
00:04:57,270 --> 00:04:55,280
for discoveries of

136
00:04:59,830 --> 00:04:57,280
or at least

137
00:05:01,909 --> 00:04:59,840
looking into any other type of diseases

138
00:05:03,749 --> 00:05:01,919

to see how the effect of microgravity

139
00:05:05,350 --> 00:05:03,759
might affect it

140
00:05:07,029 --> 00:05:05,360
well it seems like it's a very popular

141
00:05:07,749 --> 00:05:07,039
experiment that's going on station do

142
00:05:09,749 --> 00:05:07,759
you think you'll have a lot of

143
00:05:11,990 --> 00:05:09,759
contestants for next next year's

144
00:05:14,790 --> 00:05:12,000
competition uh we're very excited about

145
00:05:17,990 --> 00:05:14,800
next year's competition so uh april 25th

146
00:05:20,070 --> 00:05:18,000
marked national dna day and as part of

147
00:05:22,390 --> 00:05:20,080
that we had the end of submissions for

148
00:05:24,310 --> 00:05:22,400
the genes in space 2 competition so

149
00:05:27,110 --> 00:05:24,320
we've already received over 400

150
00:05:29,749 --> 00:05:27,120
applicants uh it really reached across

151
00:05:32,550 --> 00:05:29,759
the u.s we had 90 schools participating

152
00:05:35,189 --> 00:05:32,560
in over 900 students so we're quite

153
00:05:37,510 --> 00:05:35,199
excited there'll be a lot of late nights

154
00:05:40,310 --> 00:05:37,520
between now and mid the month to

155
00:05:42,629 --> 00:05:40,320
determine down to five finalists and

156
00:05:46,070 --> 00:05:42,639
those five finalists then will

157
00:05:49,430 --> 00:05:46,080
be tutored by harvard and mit phd either

158
00:05:51,430 --> 00:05:49,440
students or phds themselves scientists

159
00:05:54,150 --> 00:05:51,440
and researchers for about a six week

160
00:05:57,350 --> 00:05:54,160
period at the end of that conclusion

161
00:05:59,749 --> 00:05:57,360
then we will down select they'll come to

162
00:06:01,909 --> 00:05:59,759
san diego and for a down select to a

163
00:06:04,629 --> 00:06:01,919

single winner and they'll do oral

164
00:06:06,710 --> 00:06:04,639
presentations and we have a very uh

165
00:06:09,029 --> 00:06:06,720
distinguished panel of judges that will

166
00:06:11,909 --> 00:06:09,039
participate in that and the winner will

167
00:06:14,629 --> 00:06:11,919
be announced once that occurs then new

168
00:06:18,309 --> 00:06:14,639
england biolabs is one of our partners

169
00:06:20,790 --> 00:06:18,319
along with many pcr math for america and

170
00:06:23,350 --> 00:06:20,800
cases um they're going to host them for

171
00:06:26,150 --> 00:06:23,360
a one week session in new england so

172
00:06:28,150 --> 00:06:26,160
they'll be able to live on their campus

173
00:06:29,990 --> 00:06:28,160
and work with their

174
00:06:32,309 --> 00:06:30,000
scientists and researchers to perfect

175
00:06:34,309 --> 00:06:32,319
their experiment for our next

176
00:06:36,070 --> 00:06:34,319
launch a lot on the schedule for these

177
00:06:37,510 --> 00:06:36,080
uh for the next couple months but in the

178
00:06:39,510 --> 00:06:37,520
meantime we'll be looking forward to the

179
00:06:41,029 --> 00:06:39,520
experiment uh from the results from the

180
00:06:43,270 --> 00:06:41,039
genes in space on the international

181
00:06:45,430 --> 00:06:43,280
space station right now uh scott

182
00:06:47,110 --> 00:06:45,440
copeland project manager of boeing genes