



1
00:00:00,667 --> 00:00:12,746
[MUSIC]

2
00:00:12,746 --> 00:00:13,747
>> HI, I'M CHANCE GLENN.

3
00:00:13,747 --> 00:00:14,547
I'M THE PRESIDENT OF

4
00:00:14,547 --> 00:00:16,850
MORNINGBIRD MEDIA CORPORATION,

5
00:00:16,850 --> 00:00:18,284
AND TODAY WHAT WE'RE GONNA

6
00:00:18,284 --> 00:00:20,019
DESCRIBE TO YOU IS

7
00:00:20,019 --> 00:00:21,588
OUR NEW PRODUCT,

8
00:00:21,588 --> 00:00:24,157
THE ELECTRONIC ALCHEMY EFORGE,

9
00:00:24,157 --> 00:00:25,992
AND WHAT THE EFORGE IS,

10
00:00:25,992 --> 00:00:28,194
IS A 3D PRINTER CAPABLE OF

11
00:00:28,194 --> 00:00:31,398
CREATING FUNCTIONAL ELECTRONICS.

12
00:00:31,398 --> 00:00:32,165
THIS IS MY COLLEAGUE,

13
00:00:32,165 --> 00:00:33,633

DR. WING CHAN.

14

00:00:33,633 --> 00:00:34,634

WE'VE BEEN WORKING TOGETHER

15

00:00:34,634 --> 00:00:35,602

FOR A COUPLE OF YEARS NOW,

16

00:00:35,602 --> 00:00:38,071

RIGHT, TO, UH, MAKE THIS

17

00:00:38,071 --> 00:00:38,905

A REALITY.

18

00:00:38,905 --> 00:00:39,973

WELL, WHAT WE HAVE HERE

19

00:00:39,973 --> 00:00:41,608

IS A, UH, DESIGN OF

20

00:00:41,608 --> 00:00:43,376

A SIMPLE PRESSURE SENSOR,

21

00:00:43,376 --> 00:00:44,210

AND IT'S MADE UP OF, UH,

22

00:00:44,210 --> 00:00:46,312

THREE DIFFERENT MATERIALS.

23

00:00:46,312 --> 00:00:48,248

UH, YOU HAVE A, UM,

24

00:00:48,248 --> 00:00:49,783

INSULATING MATERIAL

25

00:00:49,783 --> 00:00:50,650

AT THE BOTTOM.

26
00:00:50,650 --> 00:00:52,652
THEN YOU HAVE A CONDUCTING

27
00:00:52,652 --> 00:00:54,287
AND RESISTIVE TYPE MATERIAL

28
00:00:54,287 --> 00:00:55,889
HERE, AND IN THE MIDDLE,

29
00:00:55,889 --> 00:00:57,056
UH, IS THE, UH,

30
00:00:57,056 --> 00:00:58,825
CAPACITIVE MATERIAL.

31
00:00:58,825 --> 00:01:01,161
NOW, THE WAY WE GENERALLY

32
00:01:01,161 --> 00:01:03,663
DO THIS, WE'VE ASSIGNED

33
00:01:03,663 --> 00:01:07,000
MATERIAL TYPES TO, UH, COLORS

34
00:01:07,000 --> 00:01:08,802
IN TINKERCAD.

35
00:01:08,802 --> 00:01:10,503
TINKERCAD IS A WELL KNOWN

36
00:01:10,503 --> 00:01:11,805
CAD PROGRAM THAT WE USE

37
00:01:11,805 --> 00:01:14,240
AS A DRAWING PLATFORM,

38
00:01:14,240 --> 00:01:17,243

AND, UH, SO-SO GREEN,

39

00:01:17,243 --> 00:01:19,779

THIS GREEN IS ASSOCIATED TO

40

00:01:19,779 --> 00:01:21,181

THE INSULATOR.

41

00:01:21,181 --> 00:01:23,817

THE YELLOW HERE IS ASSOCIATED

42

00:01:23,817 --> 00:01:25,652

TO THE CAPACITIVE MATERIAL,

43

00:01:25,652 --> 00:01:27,821

AND THIS GREY IS ASSOCIATED

44

00:01:27,821 --> 00:01:30,190

TO THE RESISTIVE MATERIAL,

45

00:01:30,190 --> 00:01:31,791

SO IN COMBINATION, THIS WOULD

46

00:01:31,791 --> 00:01:33,760

BE A PRESSURE SENSOR,

47

00:01:33,760 --> 00:01:35,695

BECAUSE WHEN YOU APPLY PRESSURE

48

00:01:35,695 --> 00:01:38,998

DOWN ON THE TOP OF THIS SENSOR,

49

00:01:38,998 --> 00:01:41,201

IT'S GONNA DEFORM THE MATERIAL

50

00:01:41,201 --> 00:01:43,036

IN THE MIDDLE, AND THEREFORE

51
00:01:43,036 --> 00:01:45,138
CHANGING THE CAPACITANCE,

52
00:01:45,138 --> 00:01:46,272
AND THAT'S SOMETHING THAT

53
00:01:46,272 --> 00:01:48,174
YOU CAN SEE IN THE RC

54
00:01:48,174 --> 00:01:49,476
TIME CONSTANT.

55
00:01:49,476 --> 00:01:51,311
AND THAT ALLOWS YOU TO ASSOCIATE

56
00:01:51,311 --> 00:01:52,912
THAT TO AN AMOUNT OF PRESSURE,

57
00:01:52,912 --> 00:01:54,047
SO THAT'S JUST AN EXAMPLE

58
00:01:54,047 --> 00:01:55,315
OF SOMETHING THAT YOU

59
00:01:55,315 --> 00:01:56,616
CAN PRINT.

60
00:01:56,616 --> 00:01:58,551
SO THEN YOU WOULD TAKE THIS

61
00:01:58,551 --> 00:02:01,921
AND EXPORT IT AS A, UM,

62
00:02:01,921 --> 00:02:04,324
A .OBJ FILE.

63
00:02:04,324 --> 00:02:06,226

AND THEN YOU WILL--

64

00:02:06,226 --> 00:02:08,361
CAN TRANSLATE THAT INTO G CODE,

65

00:02:08,361 --> 00:02:10,029
WHICH THE G CODE IS WHAT

66

00:02:10,029 --> 00:02:12,298
DRIVES THE 3D PRINTER.

67

00:02:12,298 --> 00:02:14,167
AND SO THESE COLORS

68

00:02:14,167 --> 00:02:15,702
AND THESE MATERIALS ARE THEN

69

00:02:15,702 --> 00:02:18,805
ASSOCIATED WITH THESE, UH,

70

00:02:18,805 --> 00:02:21,040
PARTICULAR, UH, FILAMENTS,

71

00:02:21,040 --> 00:02:22,208
AND RIGHT HERE IS

72

00:02:22,208 --> 00:02:24,644
THE RESISTIVE FILAMENT.

73

00:02:24,644 --> 00:02:27,280
THIS IS THE, UH, UH,

74

00:02:27,280 --> 00:02:29,516
INSULATING, UH, MATERIAL HERE,

75

00:02:29,516 --> 00:02:30,950
AND THIS IS

76
00:02:30,950 --> 00:02:32,418
THE CAPACITIVE MATERIAL HERE,

77
00:02:32,418 --> 00:02:33,920
AND THAT WOULD ACTUALLY

78
00:02:33,920 --> 00:02:35,989
GET PRINTED HERE ON, UM,

79
00:02:35,989 --> 00:02:38,191
OUR-OUR PROTOTYPE PRINTER.

80
00:02:38,191 --> 00:02:40,727
NOW WHAT THIS EFORGE DOES,

81
00:02:40,727 --> 00:02:42,529
IT'S A COMBINATION OF

82
00:02:42,529 --> 00:02:43,463
SEVERAL MATERIALS.

83
00:02:43,463 --> 00:02:44,764
ELECTRONICS IS JUST THAT.

84
00:02:44,764 --> 00:02:45,865
YOU PUT DIFFERENT

85
00:02:45,865 --> 00:02:46,866
MATERIALS TOGETHER,

86
00:02:46,866 --> 00:02:47,967
YOU'LL GET DEVICES THAT DO

87
00:02:47,967 --> 00:02:49,369
ALL KINDS OF THINGS,

88
00:02:49,369 --> 00:02:52,272

FROM A CELL PHONE TO SENSORS,

89

00:02:52,272 --> 00:02:54,140
TO YOU NAME IT.

90

00:02:54,140 --> 00:02:56,509
SO WE'RE ABLE TO PRINT

91

00:02:56,509 --> 00:02:58,144
AT LEAST SIX DIFFERENT

92

00:02:58,144 --> 00:03:00,413
MATERIALS SIMULTANEOUSLY,

93

00:03:00,413 --> 00:03:02,248
AND WE HAVE A PROPRIETARY

94

00:03:02,248 --> 00:03:04,183
MIXTURE OF THESE FILAMENTS.

95

00:03:04,183 --> 00:03:05,919
WE'VE WORKED HOURS AND HOURS

96

00:03:05,919 --> 00:03:08,321
TOGETHER TO CREATE

97

00:03:08,321 --> 00:03:12,091
THESE MATERIALS THAT TOGETHER

98

00:03:12,091 --> 00:03:13,459
CREATE ELECTRONICS.

99

00:03:13,459 --> 00:03:14,527
VERY EXCITING.

100

00:03:14,527 --> 00:03:16,329
WE'RE HOPING THAT NASA

101
00:03:16,329 --> 00:03:17,764
ADOPTS US.

102
00:03:17,764 --> 00:03:18,965
NASA HAS BEEN A VERY STRONG

103
00:03:18,965 --> 00:03:21,701
PARTNER, UH, WITH US.

104
00:03:21,701 --> 00:03:22,835
THEY HAVE SUPPORTED THIS WORK

105
00:03:22,835 --> 00:03:24,904
FROM THE VERY BEGINNING.

106
00:03:24,904 --> 00:03:26,472
WE'VE HAD SEVERAL--

107
00:03:26,472 --> 00:03:27,407
WELL, WE'VE HAD STR--

108
00:03:27,407 --> 00:03:29,742
STTRs TO DEVELOP

109
00:03:29,742 --> 00:03:32,011
THIS TECHNOLOGY, AND WE'RE AT

110
00:03:32,011 --> 00:03:34,714
THE STAGE NOW WHERE WE HAVE OUR

111
00:03:34,714 --> 00:03:38,651
0.6 VERSION OF OUR PROTOTYPE.

112
00:03:38,651 --> 00:03:41,521
AND YES, WE ARE PREPARING

113
00:03:41,521 --> 00:03:43,890

TO PROVIDE THIS AS

114

00:03:43,890 --> 00:03:45,425

A COMMERCIAL PRODUCT

115

00:03:45,425 --> 00:03:47,060

TO, UH, PEOPLE ALL AROUND

116

00:03:47,060 --> 00:03:48,261

THE WORLD.

117

00:03:48,261 --> 00:03:50,229

UH, WE ARE DEVELOPING

118

00:03:50,229 --> 00:03:51,431

A COMMERCIAL VERSION OF THIS

119

00:03:51,431 --> 00:03:52,632

THAT-THAT WILL BE AVAILABLE

120

00:03:52,632 --> 00:03:53,933

NEXT YEAR.

121

00:03:53,933 --> 00:03:55,868

BUT WHAT THIS DOES, THERE ARE

122

00:03:55,868 --> 00:03:58,171

SEVERAL MATERIALS THAT CAN

123

00:03:58,171 --> 00:03:59,772

BE PRINTED AND PUT TOGETHER

124

00:03:59,772 --> 00:04:02,875

TO CREATE A FUNCTIONAL

125

00:04:02,875 --> 00:04:04,077

ELECTRONIC DEVICE.

126
00:04:04,077 --> 00:04:04,978
THIS IS EXCITING.

127
00:04:04,978 --> 00:04:06,245
I DON'T THINK ANYBODY IN

128
00:04:06,245 --> 00:04:07,246
THE WORLD IS DOING THIS.

129
00:04:07,246 --> 00:04:09,182
WE HOPE NASA USES THIS

130
00:04:09,182 --> 00:04:10,650
ON THEIR MISSIONS.

131
00:04:10,650 --> 00:04:12,218
UH, YOU KNOW, AND TO--

132
00:04:12,218 --> 00:04:15,288
ON-- IN SPACE, ON NEW PLANETS,

133
00:04:15,288 --> 00:04:17,357
ON EARTH, YOU NAME IT.

134
00:04:17,357 --> 00:04:18,625
BUT, UH, THIS IS

135
00:04:18,625 --> 00:04:20,893
THE ELECTRONIC ALCHEMY EFORGE,

136
00:04:20,893 --> 00:04:23,463
AND WE ARE TRYING TO ENHANCE

137
00:04:23,463 --> 00:04:25,131
AND ENCOURAGE INNOVATION