



1

00:00:00,010 --> 00:00:04,200

[music] >>Sandra: Every time I work on a rocket launch I

2

00:00:04,200 --> 00:00:08,230

get chills. During the count down, I hold

3

00:00:08,230 --> 00:00:12,280

my breath. The count down is so terrifying because the

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00:00:12,280 --> 00:00:16,380

satellite that I have worked on is going into space on top of a bomb.

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00:00:16,380 --> 00:00:20,720

This rocket can be delivered safely into orbit, or it can blow up in an instant.

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00:00:20,720 --> 00:00:24,780

The climax for me, and for everyone working on

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00:00:24,780 --> 00:00:29,040

this amazing project is the point of liftoff and separation.

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00:00:29,040 --> 00:00:33,050

I know many of you have watched rockets launch from

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00:00:33,050 --> 00:00:37,250

NASA on television. The sound is so overwhelming.

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00:00:37,250 --> 00:00:41,580

When the sound waves travel across the three and a half miles from the launch pad to those

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00:00:41,580 --> 00:00:45,640

watching the launch, we not only hear the liftoff, we

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00:00:45,640 --> 00:00:49,890

actually feel it. It is so amazing.

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00:00:49,890 --> 00:00:54,170

We are completely engulfed in that noise and the sound, it's

14

00:00:54,170 --> 00:00:58,190

just incredible. It is thrilling to realize that this rocket,

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00:00:58,190 --> 00:01:02,370

with a satellite I have helped build, is heading at 17,600

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00:01:02,370 --> 00:01:06,760

miles per hour into space.

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00:01:06,760 --> 00:01:10,850

And guess what, I just finished launching a satellite to Mars.

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00:01:10,850 --> 00:01:14,910

It is just incredible that a little piece of me and a little piece of

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00:01:14,910 --> 00:01:18,990

Costa Rica has travelled to Mars and is now orbiting the

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00:01:18,990 --> 00:01:23,070

Red Planet. We need to understand the processes that contributed

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00:01:23,070 --> 00:01:27,390

to Mars becoming the dry and arid planet that it is

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00:01:27,390 --> 00:01:31,740

today. And we want to understand all the issues that we have

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00:01:31,740 --> 00:01:36,230

with climate change, if any of those processes are occurring here on Earth.

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00:01:36,230 --> 00:01:40,310

We really want to understand what happened, so we can

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00:01:40,310 --> 00:01:44,700

prevent all of that from happening on Earth later on.

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00:01:44,700 --> 00:01:48,750

I am also so amazed at how far I have traveled to get where

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00:01:48,750 --> 00:01:53,140

I am today. I marvel at my own journey,

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00:01:53,140 --> 00:01:57,190

and how I came to help probe the mysteries of outer space.

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00:01:57,190 --> 00:02:01,540

Michelangelo once said,

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00:02:01,540 --> 00:02:05,620

"The greatest danger for most of us is not that our aim is too high and we miss it,

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00:02:05,620 --> 00:02:09,630

but that it is too low and we actually reach it."

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00:02:09,630 --> 00:02:13,810

My story today is how a Costa Rican girl from a poor family

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00:02:13,810 --> 00:02:17,850

nurtured an improbable dream about space travel and made that dream come

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00:02:17,850 --> 00:02:22,230

true. My story began a long time ago.

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00:02:22,230 --> 00:02:26,580

My first years were very full of mistreatment and pain.

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00:02:26,580 --> 00:02:30,880

My mother was forced to take two jobs, sometimes three,

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00:02:30,880 --> 00:02:35,030

just to make ends meet. My mother worked most of the time.

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00:02:35,030 --> 00:02:39,310

Sometimes she would come home in between jobs just to sleep a few hours and then have to turn

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00:02:39,310 --> 00:02:43,340

around and go back to work. We knew she was dead tired, but

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00:02:43,340 --> 00:02:47,580

she still took some time to be with us and play with us and talk to us.

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00:02:47,580 --> 00:02:51,650

For many years, my mother kept food on our table and a roof over our heads.

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00:02:51,650 --> 00:02:55,670

I was always in awe of her perseverance and determination

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00:02:55,670 --> 00:02:59,680

to keep on going without complaining. She would not let herself

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00:02:59,680 --> 00:03:03,910

break under all the pressure that she was under. I continued

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00:03:03,910 --> 00:03:07,930

to take care of the house chores and my younger brother while going to school.

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00:03:07,930 --> 00:03:11,960

hardships, and everything I had to do. During my

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00:03:11,960 --> 00:03:15,970

elementary school years, I had a very compassionate teacher. Her name

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00:03:15,970 --> 00:03:20,070

is Leda Espinosa de Valverde. We called her

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00:03:20,070 --> 00:03:24,120

la Niña Leda.

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00:03:24,120 --> 00:03:28,250

She was a loving person and demanded a lot of her students. She taught us to take pride in everything

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00:03:28,250 --> 00:03:32,280  
that we did and to pay attention to all of the details.

52  
00:03:32,280 --> 00:03:36,300  
Our "libros de vida" had to be cleaned, organized, and the letters

53  
00:03:36,300 --> 00:03:40,450  
had to be perfect. Everything had to be just right. Through la Niña

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00:03:40,450 --> 00:03:44,500  
Leda, I learned to take pride in everything I did and to try to

55  
00:03:44,500 --> 00:03:48,670  
do it correctly the first time. Sometimes

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00:03:48,670 --> 00:03:52,990  
what I was doing seemed almost impossible. It would have been easy

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00:03:52,990 --> 00:03:57,150  
to just listen to my own thoughts, just to give up, why did I have to study so

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00:03:57,150 --> 00:04:01,340  
much, or how tired I was and go to sleep and not even bother.

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00:04:01,340 --> 00:04:05,560  
But, I would not let my thinking become my

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00:04:05,560 --> 00:04:09,640  
obstacle. I told myself that I had to do better, that

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00:04:09,640 --> 00:04:13,660  
I had to take time to study, that I had to do my homework, even if I didn't get much

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00:04:13,660 --> 00:04:17,690  
sleep. It was important to me to get good grades.

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00:04:17,690 --> 00:04:22,010

I knew I didn't want the kind of life that I saw

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00:04:22,010 --> 00:04:26,230

wearing my mother down. I dreamed of escaping the poverty and pain.

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00:04:26,230 --> 00:04:30,300

I wanted to do something different when I grew up.

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00:04:30,300 --> 00:04:34,330

The dream that began taking shape in me became my escape from

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00:04:34,330 --> 00:04:38,510

the only world that I knew. Sometimes we

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00:04:38,510 --> 00:04:42,900

remember exactly where we were and what we were doing during a significant

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00:04:42,900 --> 00:04:47,040

historical event. Well, July 20th, 1969

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00:04:47,040 --> 00:04:51,320

was one such event for me. I was seven years old.

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00:04:51,320 --> 00:04:55,420

I wanted to watch the first human walk on the Moon. We did not have a

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00:04:55,420 --> 00:04:59,460

television at home, so we went to a neighbor's house.

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00:04:59,460 --> 00:05:03,760

All of the kids were clustered around a small black and white television.

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00:05:03,760 --> 00:05:07,890

There were many people in the room, some were lying on the floor,

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00:05:07,890 --> 00:05:12,160

while others were standing behind the sofa. We watched in total silence.

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00:05:12,160 --> 00:05:16,230

We could hear a pin drop in that room.

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00:05:16,230 --> 00:05:20,420

We were in awe when we saw an American named Neil Armstrong place

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00:05:20,420 --> 00:05:24,710

his foot on the surface of the Moon for the first time. The TV

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00:05:24,710 --> 00:05:28,720

crackled out his words: "One small step for

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00:05:28,720 --> 00:05:32,850

man, one giant leap for mankind." This really was

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00:05:32,850 --> 00:05:37,140

a giant leap. I walked home that night and looked at the Moon

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00:05:37,140 --> 00:05:41,200

so far away, and I knew then that I wanted to be part of that adventure.

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00:05:41,200 --> 00:05:45,390

I would be lying if I said that I knew what NASA was at that moment.

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00:05:45,390 --> 00:05:49,750

However, I knew that I wanted to work in space.

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00:05:49,750 --> 00:05:53,870

I wanted to be able to go to the Moon someday.

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00:05:53,870 --> 00:05:57,890

So I remember saying to my mother, "I want to do that someday, Mom." And Mom

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00:05:57,890 --> 00:06:01,890

could have said so many things that would have deterred me at that point.

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00:06:01,890 --> 00:06:06,040

But what she said set in motion my determination to become who I am today.

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00:06:06,040 --> 00:06:10,340

She said, "Sandra, you never know. Just work hard for what

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00:06:10,340 --> 00:06:14,340

you want. The world goes around and around, and you never know

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00:06:14,340 --> 00:06:18,340

what opportunities might present themselves, and you have to be ready to get them."

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00:06:18,340 --> 00:06:22,750

The world did go round and round and our problems continued.

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00:06:22,750 --> 00:06:26,880

During this time I realized that I had

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00:06:26,880 --> 00:06:30,920

to take ownership of my actions. My success was up to

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00:06:30,920 --> 00:06:35,110

me. It was not my mother's or my teacher's responsibility to make me

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00:06:35,110 --> 00:06:39,360

succeed. It was my responsibility.

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00:06:39,360 --> 00:06:43,720

I saw how hard my mother worked just to survive, and I tried to learn

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00:06:43,720 --> 00:06:47,760

by her experiences. That became my goal,

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00:06:47,760 --> 00:06:52,020

"not to repeat history," and of course "to go to the Moon."

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00:06:52,020 --> 00:06:56,040

When I was 12 years old, we lost our house

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00:06:56,040 --> 00:07:00,180

and we started moving from place to place.

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00:07:00,180 --> 00:07:04,550

Mom would rent a room here and there, but we had to move frequently.

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00:07:04,550 --> 00:07:08,630

I was determined to graduate from high school and to go to college.

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00:07:08,630 --> 00:07:12,800

I tried to always find people who would elevate me and not

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00:07:12,800 --> 00:07:17,080

to get with the wrong crowds. It allowed me to take all these

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00:07:17,080 --> 00:07:21,140

baby steps that I need toward my very lofty goal to go to the Moon

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00:07:21,140 --> 00:07:25,270

some day. I wanted to do things differently,

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00:07:25,270 --> 00:07:29,290

I was always remembering in the back of my head what my mother used to tell me - "Do not

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00:07:29,290 --> 00:07:33,450

repeat history." So I wanted to do things very very differently.

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00:07:33,450 --> 00:07:37,780

I talked to my teachers and other people who would give me good advice

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00:07:37,780 --> 00:07:41,920

and ideas. I tried to recognize all the bad ideas and

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00:07:41,920 --> 00:07:46,030

separate myself from all of those people who always tried to give you bad advice.

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00:07:46,030 --> 00:07:50,210

I continued to nurture the dream of space travel

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00:07:50,210 --> 00:07:54,250

in my mind and in my heart. And it was still pulling me forward.

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00:07:54,250 --> 00:07:58,310

One of my intermediate goals was to become an electrical engineer.

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00:07:58,310 --> 00:08:02,480

When I was accepted at the University of Costa Rica,

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00:08:02,480 --> 00:08:07,030

the counselor said that I could not study electrical engineering because I was

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00:08:07,030 --> 00:08:11,490

a woman. He recommended that I study industrial engineering

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00:08:11,490 --> 00:08:15,570

instead because that was the ladylike engineering.

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00:08:15,570 --> 00:08:19,720

I spent three and half years studying industrial engineering

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00:08:19,720 --> 00:08:23,930

at the University of Costa Rica. Well,

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00:08:23,930 --> 00:08:31,440

I definitely admit that in that point in my life, I underestimated my own abilities.

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00:08:31,440 --> 00:08:35,930

I knew that I was capable, but I didn't feel like I was assertive enough. It did not cross my mind

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00:08:35,930 --> 00:08:40,390

to assert myself and insist that I really wanted to study electrical

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00:08:40,390 --> 00:08:44,610

engineering rather than industrial. I decided to change majors.

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00:08:44,610 --> 00:08:49,020

I figured at that point it wouldn't hurt. I finally decided

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00:08:49,020 --> 00:08:53,100

to study what I always wanted to study which was electrical engineering.

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00:08:53,100 --> 00:08:57,280

I became a transfer student, and out of the major credits that I had

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00:08:57,280 --> 00:09:01,610

at the University of Costa Rica, only 31 were recognized, so I had to

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00:09:01,610 --> 00:09:05,620

start pretty much all over again. There were

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00:09:05,620 --> 00:09:09,850

many many challenges in front of my still. I spoke almost

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00:09:09,850 --> 00:09:13,900

no English. I only had the English that I knew from high school.

133

00:09:13,900 --> 00:09:18,040

So it was very hard for me. It took me three and a half more years

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00:09:18,040 --> 00:09:22,050

to get my degrees. At that point, I was on the seven year

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00:09:22,050 --> 00:09:26,160

plan to graduation. I finally graduated

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00:09:26,160 --> 00:09:30,340

with a double major in electrical engineering and physics.

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00:09:30,340 --> 00:09:34,460

After graduation, I went to a job fair, which led to an

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00:09:34,460 --> 00:09:38,820

interview. I never forget being

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00:09:38,820 --> 00:09:43,250

offered the job on the spot. I had overcome

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00:09:43,250 --> 00:09:47,380

so many obstacles and now there was a wonderful opportunity to work at

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00:09:47,380 --> 00:09:51,580

Goddard as a contractor. Three years later,

142

00:09:51,580 --> 00:09:55,840

I was hired by the agency. I finally became a

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00:09:55,840 --> 00:10:00,120

full-fledged civil servant. and the reason this happened was

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00:10:00,120 --> 00:10:04,530

because during my three years as a contractor, I worked on

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00:10:04,530 --> 00:10:09,400

many optical systems working with scientists hand-by-hand

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00:10:09,400 --> 00:10:13,450

and I was noticed. And when I put in that resume,

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00:10:13,450 --> 00:10:17,900

they gave me the job, and I was so so happy

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00:10:17,900 --> 00:10:21,950

that finally after all the years

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00:10:21,950 --> 00:10:26,370

and all of the challenges, I finally became a NASA employee.

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00:10:26,370 --> 00:10:30,550

I have been working for NASA now for

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00:10:30,550 --> 00:10:35,080

23 and a half years as a full-fledged civil servant.

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00:10:35,080 --> 00:10:39,140

Working at NASA has enabled me to design and

153

00:10:39,140 --> 00:10:43,180

test hardware, work side by side with talented scientists,

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00:10:43,180 --> 00:10:47,490

and design new missions for space exploration. I work with

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00:10:47,490 --> 00:10:51,530

so many amazing people who think of things nobody had ever done before,

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00:10:51,530 --> 00:10:55,800

and they inspire me so much every day.

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00:10:55,800 --> 00:10:59,930

Our work isn't easy; it's very very hard. And I really love it.

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00:10:59,930 --> 00:11:04,090

My dream, as you have heard,

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00:11:04,090 --> 00:11:08,430

was very very lofty and perhaps a bit unrealistic.

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00:11:08,430 --> 00:11:12,680

My path was very difficult, and at any moment I could have given up.

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00:11:12,680 --> 00:11:16,920

But I made a conscious choice to move towards a different life

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00:11:16,920 --> 00:11:20,960

for myself. I made deliberate decisions that put me in

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00:11:20,960 --> 00:11:25,160

unfamiliar situations. Many of the experiences I

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00:11:25,160 --> 00:11:29,390

sought out were not only new, but they were very very scary.

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00:11:29,390 --> 00:11:33,730

I didn't know if I would achieve my goal, but I didn't allow

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00:11:33,730 --> 00:11:38,000

myself to be overcome by doubts or negative thinking.

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00:11:38,000 --> 00:11:42,030

I was very determined to change my behavior so I didn't have to repeat the past

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00:11:42,030 --> 00:11:46,240

and repeat history. So continue to bring new

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00:11:46,240 --> 00:11:50,610

thoughts, ideas, and perceptions into your life, and get to know

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00:11:50,610 --> 00:11:54,810

different people with different perspectives, different occupations,

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00:11:54,810 --> 00:11:58,910

cultures, religions. The bottom line is,

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00:11:58,910 --> 00:12:03,270

that with perseverance and staying true to my dream in life, I was able to

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00:12:03,270 --> 00:12:07,350

achieve what many people thought I shouldn't have even considered.

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00:12:07,350 --> 00:12:11,570

Life is never easy. But the circumstances of your birth should not

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00:12:11,570 --> 00:12:15,720

take the kind of person that you can become. You have control

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00:12:15,720 --> 00:12:19,770

of your destiny. So, set lofty goals

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00:12:19,770 --> 00:12:23,800

with intermediate goals along the way. While you many never achieve your

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00:12:23,800 --> 00:12:27,870

lofty goal, in an effort to reach it, you will always

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00:12:27,870 --> 00:12:32,150

go very very far. If you reach far enough you

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00:12:32,150 --> 00:12:36,410

may yet accomplish your dreams. When I was seven years old, I wanted