SCIENCE HISTORY INSTITUTE

RORY COOPER

Science and Disability

Transcript of an Interview
Conducted by

Greg S. Waters and Jessica L. Martucci

at

Human Engineering Research Laboratories
Pittsburgh, Pennsylvania

on

22 and 23 June 2017

(With Subsequent Corrections and Additions)

VA Healthcare System

Rory Cooper

CHEMICAL HERITAGE FOUNDATION
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Rory A Cooper

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RORY COOPER

1959 Born in Los Angeles, California, on 9 November

Education

1985 BS, California Polytechnic State University, San Luis Obispo, Electrical Engineering, Signals and Systems

1986 MEng, California Polytechnic State University, San Luis Obispo, Electrical Engineering, Computer Control Systems

1989 PhD, University of California, Santa Barbara, Electrical and Computer Engineering, Biomedical Engineering and Signals & Systems

Professional Experience

United States Army

1976-1982 Soldier

Eurosprachschule Institute for Language Studies

1977-1980 Language Instructor

Equalizer Wheelchair Company, Inc.

1981-1982 Language Instructor

Cooper Engineering Company

1982-1985 Design Engineer

California Polytechnic State University, San Luis Obispo

1985-1986 Lecturer, Department of Electrical and Electronic Engineering

Pacific Gas and Electrical Company

1985-1986 Engineer, Instrumentation and Controls Group

University of California, Santa Barbara

1986-1988 Teaching Assistant, Department of Electrical and Computer Engineering

1988-1989 Research Assistant, Institute of Environmental Stress & Control Systems Lab

	California State University, Sacramento
1989-1991	Assistant Professor, Assistive Device Center
1989-1991	Assistant Professor, Department of Electrical Engineering and Biomedical Engineering Program
1990-1994	Director, Human Engineering Laboratory
1990-1994	Coordinator, Rehabilitation Engineering Program
1991-1992	Associate Professor, Department of Electrical Engineering and Biomedical Engineering Program
1992-1994	Associate Professor with Tenure, Department of Electrical Engineering and Biomedical Engineering Program
	Edward Hines Jr. Hospitable Rehabilitation Research and Development Center
1990-1995	Research Scientist, Rehabilitation Research and Design Center
	University of Pittsburgh
1994	Associate Visiting Professor
1994	Founding Director, School of Health and Rehabilitation Sciences, and School of Medicine, Human Engineering Research Laboratories
1994-1997	Director, School of Health and Rehabilitation Sciences, Rehabilitation Engineer Program, Department of Rehabilitation Science and Technology
1994-1995	Associate Professor, School of Health and Rehabilitation Sciences, Department of Rehabilitation Science and Technology
1994-1998	Associate Professor, School of Engineering, Department of Mechanical Engineering and Bioengineering Program
1994	Graduate Faculty, School of Health and Rehabilitation Sciences
1994-1998	Associate Professor with Tenure, School of Health and Rehabilitation Sciences, Department of Rehabilitation Science and Technology
1997-2018	Chairman, School of Health and Rehabilitation Sciences, Department of Rehabilitation Science and Technology
1998-present	Professor, School of Health and Rehabilitation Sciences, Department of Rehabilitation Science and Technology
1998-present	Professor, School of Engineering, Departments of Mechanical Engineering and Bioengineering
2004-present	Distinguished Professor, School of Health and Rehabilitation Sciences, Department of Rehabilitation Science and Technology
2004-present	FISA/PVA Endowed Professor, School of Health and Rehabilitation Sciences, Department of Rehabilitation Science and Technology
2016-2020	Associate Dean, School of Health and Rehabilitation Sciences

2021-present	Assistant Vice-Chancellor for Research for STEM and Health Sciences Collaboration, Office of the Senior Vice-Chancellor for Research
	Veterans Affairs Pittsburgh Healthcare System
1994-present	Principal Investigator
	Carnegie Mellon University
1995-1996	Associate Professor, Department of Design
2007	Professor, Robotics Institute, School of Computer Science
	University of Pittsburgh Medical Center
1995-1998	Associate Professor, School of Medicine, Department of Orthopedic Surgery
1998-present	Professor, School of Medicine, Department of Orthopedic Surgery
	US Department of Veterans Affairs
1999-present	Center Director, Center of Excellence for Wheelchair and Related Technology, VA Rehabilitation Research and Development Service
2000-present	Senior Research Career Scientist, VA Rehabilitation Research and Development Service
	Uniformed Services University of Health Sciences
2016-present	Professor, School of Medicine, Department of Physical Medicine and Rehabilitation

Honors

1980	KONTAKT Europe High Achievement Award
1984	San Luis Obispo Bicentennial Medal and Proclamation of Wheelchair Athlete Day
1990	National Wheelchair Athletic Association Service Award
1992	CSUS President's Award for Outstanding Research
1993	IEEE-EMBS Early Career Achievement Award
1997	KPVA John Farkas Leadership Award
1998	LaRoche College Thanksgiving Tuesday Award
1998	Institute of Electrical and Electronic Engineers (IEEE) Fellow
1998	American Institute of Medical and Biological Engineering (AIMBE) Fellow
1999	California Polytechnic State University College of Engineering 1999 Honored Alumnus
2001	Dion Johnson Foundation Spinal Cord Injury Research Award
2001	IEEE-USA Professional Leadership Award

2001	Honorary Professorship, Jockey Club Rehabilitation Engineering Centre and Department of Health Technology Informatics
2002	US Department of Veterans Affairs Olin E. Teague Award
2002	Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Mentor Award
2002	Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Fellow
2002	Best Paper for Research in Multiple Sclerosis
2003	The Cool Engineer of the Month, November, Junior Engineering Technical Society
2003	U.S. Department of Veterans Affair, Rehabilitation Research and Development Service, Paul B. Magnuson Award
2004	Excellence Award, American Paraplegia Society
2005	Maxwell J. Schleifer Distinguished Service Award, Exceptional Parent Magazine
2005	Leadership Award, Department of Rehabilitation Science & Technology, Rehabilitation Engineering and Assistive Technology Society of North America
2005	Chancellor's Affirmative Action Award, Department of Rehabilitation Science & Technology
2005	2004 Best Paper Award Presented by Liberty Mutual & International Journal of Industrial Ergonomics
2005	Flag of the United States of America Flown over the Pentagon Building and accompanying Certificate of Appreciation
2005	National Spinal Cord Injury Association (NSCIA) "Hall of Fame"
2005	James J. Peters Lecture Award, American Paraplegia Society
2005	Honorary Professorship, Xi'an Jiaotong University, China
2006	Certificate of Appreciation from the National Institute on Child Health and Human Development, National Institutes of Health
2007	Power of Work Award, Goodwill Industries of Western, Pennsylvania
2007	Biomedical Engineering Society (BMES) Elected Fellow
2007	da Vinci Lifetime Achievement Award, National MS Society, Michigan Chapter
2007	Certificate of Appreciation from the Marine for Life Program, United States Marine Corps
2008	Disabled Veteran of the Year 2007, Veterans Community Initiatives, Veterans Leadership Program of Western Pennsylvania
2009	Flag of the United States of America Flown over Walter Reed Army Medical Center and accompanying Certificate of Appreciation
2009	Veteran of the Year, Veterans Leadership Program
2009	Community Hero Award, United Cerebral Palsy of Allegheny County
2009	TRCIL Senator John Heinz Memorial Award, Three Rivers Center for Independent Living

2009	Outstanding Civilian Service Medal, Headquarters, Medical Command, Department of the Army
2009	Commander's Award for Public Service, Walter Reed Healthcare System, Dept. of the Army
2009	Wall of Sports Fame, Heinz History Center in association with the Smithsonian Institute
2009	Proclamation of House of Representatives of the Commonwealth of Pennsylvania
2009	Proclamation of Senate of the Commonwealth of Pennsylvania
2009	Angel of Change Award, Easter Seals of Western Pennsylvania
2010	Order of Military Medical Merit, Membership #8650
2010	The Pennsylvania Meritorious Service Medal, The Governor of the Commonwealth of Pennsylvania
2010	Proclamation of Senate of the Commonwealth of Pennsylvania
2010	Legion of Honor, Chapel of the Four Chaplains
2010	First Place in the Technical Text Category for "Care of the Combat Amputee," The Washington Book Publishers' 2010 Book Design & Effectiveness Competition
2010	Distinguished Alumni Speaker, California Polytechnic State University, Department of Electrical Engineering Spring Banquet
2010	Proclamation of Senate of the Commonwealth of Pennsylvania
2010	Outstanding Researcher Award, VA Pittsburgh Healthcare System
2010	Community Cornerstone Award, Boy Scouts of America
2010	Unbeaten Award
2010	Certificate of Appreciation, Veterans Health Administration, Department of Veterans Affairs
2011	Distinguished Civilian Service Award, U.S. Army
2011	Cliff Crase Award for Professionalism from Paralyzed Veterans of America
2011	Hall of Fame, Department of Military and Veterans Affairs, Commonwealth of Pennsylvania
2011	Outstanding Leadership Award, National Veterans Wheelchair Games
2011	Proclamation of Senate of the United States of America
2011	Flag of the United States of America Flown over VA Pittsburgh Healthcare System, Highland Drive Campus
2011	Chancellor's Award for Distinguished Public Service
2012	Distinguished Service Award, Rehabilitation and Assistive Technology Society of North America
2012	Pitt Innovator Award
2012	Certificate of Appreciation and Honorary Member of the 2nd Armored Cavalry Regiment, United States Army, Vilseck
2012	Distinguished Friend, Family and Morale, Welfare & Recreation, United States Army Garrison Grafenwoehr
2012	Mentor Award, American Association for the Advancement of Science

2013	Paralympic Sports Science Award, International Paralympic Committee
2013	Secretary's Award for Diversity and Inclusion, U.S. Department of Veterans Affairs
2013	Outstanding Civilian Service Medal, U.S. Army War College
2013	Navy Meritorious Public Service Medal, Walter Reed National Military Medical Center
2013	Secretary of Veterans Affairs Certificate of Appreciation, U.S. Department of Veterans Affairs
2013	Power of Work Award, Goodwill of Southwest Pennsylvania
2013	Top Professor, Lifetime Achievement, Affordable Colleges Online
2013	Pitt Innovator Award
2014	Joseph Engelberger Award, Robotics Industry Association
2014	Henry Viscardi Achievement Award
2014	Legion of Honor Bronze Medal, Chapel of the Four Chaplains
2014	Inaugural AAAS, Lemelson Invention Ambassador
2014	Bronze Order of Mercury, Signal Corps Regimental Association
2014	First National Resilience Award, Disabled Veterans National Foundation
2014	Pitt Innovator Award
2015	Secretary of Defense Meritorious Civilian Service Medal
2015	Fellow, National Academy of Inventors
2015	Catalyst Award, Carnegie Science Center
2015	Friend and Patriot Award, Soldiers & Sailors Museum of Pittsburgh
2015	Pitt Innovator Award
2016	Honorary Doctorate, Xi'an Jiaotong University, China
2016	Humanitarian Service Award, Central Rehabilitation Centre, Dublin, Ireland
2016	Minute Man Award, National Guard Bureau
2016	Seven Seals Award, Employers Support Guard and Reserve
2016	Liberty Bell Award, 28th Infantry Division
2016	Marlin Mickle Innovation Award, University of Pittsburgh
2016	Pitt Innovator Award
2017	Blackwood Design Award
2017	Vanguard Award and National Guard Bureau Leadership Forum Lecture, Army National Guard, National Guard Bureau
2017	Patriot Award, First Recruiting Battalion, US Army Recruiting Command
2017	Samuel E. Heyman Service to America Medal
2017	Order of Saint Maurice (Civis), National Infantry Association
2017	Susan M. Daniels Disability Mentoring Hall of Fame, National Disability Mentoring Coalition (NDMC)
2018	Fellow, American Association for the Advancement of Science
2018	Overseas Fellow of the Royal Society of Medicine
2018	Advocacy Award, American Institute of Medical and Biological Engineering: For outstanding contributions to the field of bioengineering in the service of the public good

2018	Pennsylvania Meritorious Service Medal
2018	O's 2018 Health Heroes, Oprah Winfrey's "O" Magazine
2018	Profiles in Success, Meet Eagles at the Top of their Game: Eagles' Call, National Eagle Scout Association
2018	Neighborhood Hero; Pittsburgh Symphony Orchestra
2018	Glen E. Gresham Visiting Professorship Lecture, University of Buffalo
2018	Pitt Innovator Award: For licensing, intellectual property through the University of Pittsburgh to a company for commercial use
2018	Coulter Award: Outstanding concept for a medical device or technology, PneuMobility
2018	Golden Eagle Award, Joint Force Headquarters, Pennsylvania Department of Military and Veterans Affairs
2018	On Field Recognition, Military and Veteran Appreciation Night, Pittsburgh Pirates Baseball
2019	Inventor Collectible Trading Card #28, US Patent and Trademark Office
2019	Journey of Innovation, Inventor for October 2019, US Patent and Trademark Office
2019	Sitting Tall, Inventor's Digest: Cover photo and featured inventor for September 2019
2019	Mathworks (creators of Matlab and Simulink) Innovator
2019	Distinguished Speaker Fulbright Fellows, US Department of State
2019	Distinguished Visiting Professor, Loughborough University
2019	Distinguished Speaker, 28th Infantry Division and Pennsylvania Army National Guard Memorial, Boalsburg, Pennsylvania
2019	Distinguished Lecturer, Defense Medical Rehabilitation Centre, Stanford Hall, United Kingdom
2019	Distinguished Lecturer, Care Coalition, US Special Operations Command (SOCOM)
2019	Doll-Tepper Keynote Lecturer, International Council of Sport Science and Physical Education (ICSSPE/CIEPSS)
2019	Keynote Speaker, United States Patent and Trademark Office, National Summer Teacher Institute on Innovation, STEM, and Intellectual Property
2019	Keynote Speaker, Future Professors Institute, Cornell University
2019	Distinguished Lecturer, Allegheny County Bar Association
2019	Uber Distinguished Lecturer, Uber Corporation
2019	TRAILS Distinguished Lecturer, University of Utah
2019	Osher Distinguished Lecturer, University of Pittsburgh
2019	Gold Medal, Americas Paralympic Committee
2019	Pitt Innovator Award
2019	Veteran Advocate of the Year, Pittsburgh Hires Vets
2020	NDEAM-75 and Veterans Day Speaker, Google
2020	Keynote Speaker, CSUN Conference on Assistive Technology
2020	Keynote Speaker, Augmented Human International Conference

2020	Keynote Speaker, BioBreakfast, Breathing Life into Pittsburgh's Life Sciences
2020	Keynote Speaker, Accelerated Business Program, Terry College of Business, University of Georgia
2020	Keynote Speaker, Pennsylvania Bio
2020	2020 Inspiring Programs in STEM Award, INSIGHT Into Diversity magazine
2020	Distinguished Scientist and Inventor, Family Science Days, American Association for the Advancement of Science
2021	John P. McGovern Science and Society Award, Sigma Xi Research Society
2021	Outstanding Eagle Scout, Boy Scouts of America
2021	Outstanding Veteran Faculty Member, On Field Salute, Department of Athletics, University of Pittsburgh
2021	Veteran of Major Impact, University of Pittsburgh
2021	Featured Speaker, International Rehabilitation Week, International Society for Physical and Rehabilitation Medicine
2021	Certificate of Appointment, US Department of Veterans Affairs, Secretary of Veterans Affairs
2021	World Expert in Disabled Persons, ExpertScape
2021	35th Air Carrier Access Act Anniversary Celebration Distinguished Speaker, US Department of Transportation, Office of the Secretary of Transportation
2021	NASA Disability Employment Awareness Month Distinguished Speaker, NASA Goddard Space Flight Center
2021	Pennsylvania Veteran Service Medal, Department of Military and Veteran Affairs and Governor of Pennsylvania, Commonwealth of Pennsylvania
2021	Honored Distinguished Leader, Leadership Lecture Series, Office of the Surgeon General and Commander US Army Medical Command
2021	"Tech Talk" Distinguished Engineer, Hyundai of America
2021	Distinguished Scientist Speaker, The Honors College, East Carolina University
2021	Closing Ceremonies Speaker, US Army Warrior Games Trials, Office of the Surgeon General and Commander US Army Medical Command
2021	Distinguished Scientist Speaker, 75th Anniversary Distinguished Speaker Series, Fulbright Scholars Program, US Department of State
2022	AUSA Creighton Abrams Medal, Association of the US Army
2022	IEEE Biomedical Engineering Award (Medal), Institute of Electrical and Electronics Engineers
2022	"Speedy Award," Paralyzed Veterans of America
2022	Colin McLlauren Award, Rehabilitation and Assistive Technology Society of North America
2022	Silver Pyramid Award, Boy Scouts of America

2022	Keynote Speaker, InventEd and USPTO Reconnect, Reimagine, and Reinvigorate
2023	NIH Director Wednesday Afternoon Distinguished Speaker
2023	National Inventors Hall of Fame for wheelchair technologies, National Inventors Hall of Fame and USPTO
2023	Distinguished Eagle Scout, National Eagle Scout Association.

ABSTRACT

Rory Cooper was born in Los Angeles, California, in 1959 and grew up in San Luis Obispo, California. His father was a model maker, in the United States Army Reserve, and later, a professor of biology and agriculture at the California State Polytechnic University at San Luis Obispo. His parents owned an automobile machine shop in San Luis Obispo, where his mother maintained the business. Cooper worked at the shop as a child and became interested in engineering. He has a younger sister and a younger brother, who also became engineers. He also enjoyed outdoor activities by joining Boy Scouts, becoming an Eagle Scout, and engaging in track and cross-country activities, wrestling, and chess. After he was diagnosed as having a "reading difficulty" (dyslexia) and astigmatism, his studies improved. After graduating high school in 1977, Cooper immediately joined the Army. After a series of training, he was assigned to Germany, where he met his future wife, who is German, in 1979. In 1980, he had a traffic accident while riding a bicycle, injured his spinal cord, and became a wheelchair user. He was rehabilitated in Santa Barbara and the Sepulveda VA Medical Center, California, and enrolled in a BS program in Electrical Engineering at California Polytechnic State University, San Luis Obispo in 1981. Cooper was the first wheelchair user enrolled in the electrical engineering program. Because the facility was not accessible, the team of faculty members worked with him to make the laboratories more accessible. He also gained support from fellow veteran students and the Reserve Officers' Training Corps (ROTC) at the university. During his undergraduate education, Cooper also had a consultant role with Equalizer Wheelchair Company in 1981 and started Cooper Engineering Company in 1982. He graduated with a master's degree in engineering and went to the PhD program at the University of California, Santa Barbara. He played wheelchair basketball, and this involvement led him to work with disability rights advocacy leaders Judith E. Heumann and Edward V. Roberts. Toward the end of his PhD, he participated in the 1988 Paralympics in Seoul, South Korea, where he participated wheelchair racing. Cooper's dissertation topic was the optimization of wheelchair racing performance.

After graduation, he became an assistant professor at California State University, Sacramento in 1989 where he taught rehabilitation engineering, robotics, control systems, and medical instrumentation. In 1994, Cooper became an associate visiting professor at the University of Pittsburgh, where he established the Human Engineering Research Laboratories (HERL). In the interview, he explains how he has been working with his peers in wheelchair racing and with wheelchair makers, sharing ideas to make wheelchairs that meet the needs of users, as well as how his childhood experience in his parents' automotive machine shop became the basis of his work. He ends the interview by explaining how HERL has produced pioneering engineers in the field, indicating that STEM education can offer opportunities to people with disabilities, including veterans with disabilities.

INTERVIEWERS

Jessica L. Martucci earned her master's degree in bioethics and her PhD in the history and sociology of science at the University of Pennsylvania. She is the author of numerous scholarly and popular works, including her book *Back to the Breast: Natural Motherhood and*

Breastfeeding America (University of Chicago Press, 2015). She was the lead researcher behind the Science History Institute's Science and Disability Project, which is part of her broader interest in understanding the mechanisms and effects of exclusion and inclusion in science, medicine, and public history.

Gregory S. Waters was a program assistant in the Center for Oral History. He received a BA in history and American Studies and a master's degree in American history with a concentration in public history from Arizona State University. He now works as a curator at the National Medal of Honor Museum.

ABOUT THIS TRANSCRIPT

This interview was conducted as part of the Science and Disability project, which documents the lives and contributions of people with disabilities who work or pursue degrees in STEM fields. Participants include individuals from all stages in the STEM (science, technology, engineering, and medicine) pipeline, as well as those who have left the field. The interviews in this collection explore how physical and intellectual spaces welcome or exclude people with disabilities; how scientific cultures and identities intersect with those of the diverse disability community; and what environmental, institutional, and professional barriers people with disabilities face.

The Center for Oral History, Science History Institute, is committed both to preserving the recording of each oral history interview in our collection and to enhancing research use of the interviews by preparing carefully edited transcripts of those recordings. The preparation of interview transcripts begins with the creation of a verbatim typescript of the recording and proceeds through review and editing by staff of the Center; interviewees also review the typescript and can request additions, deletions, or that sections be sealed for specified periods of time. We have established guidelines to help us maintain fidelity to the language and meaning of each recorded interview while making minor editorial adjustments for clarity and readability. Wherever possible, we supply the full names of people, organizations, or geographical locations mentioned during the interview. We add footnotes to the transcript to provide full citations for any publications that are discussed, to point to extant oral history interviews, and to clear up misstatements or provide context for ambiguous references in the transcript. We use brackets to indicate the addition of material that was not in the audio, and bracketed ellipses to indicate the deletion of recorded material. The transcript also includes time stamps at five-minute intervals. We omit without noting most instances of verbal crutches and all instances of nonlexical utterances. We also make small grammatical corrections where necessary to communicate interview participants' meaning. Finally, staff of the Center create the abstract, chronology, and table of contents. With the availability of online full-text searching of our transcripts, the Center for Oral History opted to discontinue the practice of preparing a back-of-the-book index for each oral history transcript in 2020. **The Science History Institute is committed to the responsible presentation of the history of science by addressing evidence of inequality and oppression as well as the subsequent silences in our collections. To that end, we recognize there may be language in our oral history collection that is outdated, offensive, or harmful,**

such as, but not limited to the following: racist, sexist, Eurocentric, ableist, and/or homophobic language or depictions.

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INTERVIEWEE: **Rory Cooper**

INTERVIEWERS: **Greg Waters**
Jessica Martucci

LOCATION: **Human Engineering Research Laboratory**
Pittsburgh, Pennsylvania

DATE: **22 June 2017**

WATERS: This is Greg Waters. I'm here with Jessica Martucci. It is June 22, 2017, and we're speaking today with Dr. Rory Cooper at the—I'm sorry. I missed the thing. The Human Engineering Research Laboratories here in Pittsburgh, [Pennsylvania,] where he serves as founding director. Thank you for taking the time to meet with us.

COOPER: You're welcome. It's a pleasure to be interviewed.

WATERS: I should also say this interview is being conducted as part of the Scientists with Disabilities Project at the Chemical Heritage Foundation. So let's start at the very beginning. Where were you born?

COOPER: I was born in East LA [Los Angeles], in California.

WATERS: What year? What's your birthday?

COOPER: I was born in 1959.

WATERS: Okay. How was East LA in 1959?

COOPER: Well, we didn't live there for long. We stayed there . . . I think we were about five years old when we moved out of East LA and moved to Riverside, California. Lived there for about five years. Then we moved to San Luis Obispo, California. I finished up grammar school and then went to middle school and high school in San Luis Obispo. I consider that kind of my hometown.

WATERS: Could you talk about your parents? What were their names?

COOPER: My father is Alan Cooper. My mother is Alice Cooper, not the musician. My mother was an automobile mechanic. My father actually was a model maker, which is a type of machinist. He was also in the [United States] Army Reserve, and then he went to college, studied biology, and eventually—he went to Cal Poly Pomona [California Sate Polytechnic University, Pamona], then to UC Riverside, University of California, Riverside. Then we moved to San Luis Obispo, because he got a job at Cal Poly [California Sate Polytechnic University] San Luis Obispo as a professor of biology and agriculture.

WATERS: What were they doing originally in East LA when you were born?

COOPER: My dad was a model maker and my mother worked in a bank.

WATERS: Okay. Do you have siblings?

COOPER: I do. I have a brother [Damon Cooper] and a sister [Tammy Cooper].

WATERS: Older, younger?

COOPER: Younger. I'm the oldest.

WATERS: Okay.

COOPER: We're all engineers.

WATERS: Is that your father's influence?

COOPER: He's a biologist, so no.

WATERS: He's a . . . .

COOPER: Well, I think it's the influence of being the model maker and the mechanic. My parents had an automotive machine shop my entire time growing up. So even when my dad was a professor, he still worked there part-time, and my mother ran the business.

WATERS: So did he transition later in life to being a professor?

COOPER: He did. Yes.

WATERS: What was the process of that?

COOPER: He was in his mid-thirties, I think, when he finally became a professor. But it was a family business with my grandfather. So it was Cooper & Sons Automotive. They maintained the business. That was my mom's. I worked in it as a kid. That's kind of what got me introduced and interested in engineering, because I had to learn to operate to work on cars.

WATERS: Right. They put you to work early?

COOPER: Yep. I pretty much worked all my free time after school when I was about twelve years old on, but besides doing, school and track and field and cross-country. But otherwise, it's a family business. You've got to help out when people need help. I learned to operate the lathe, the mill, and the brake lathe, and put engines in, and take them out, and do exhaust systems. So yeah that's probably why I kind of lean towards engineering. Well especially after my injury, I couldn't really—it would have been tough to do that, except for manage a business like that. Engineering allowed you to stay hands-on and creative, but in a different way.

WATERS: How old were you when you guys moved to San Luis Obispo?

COOPER: I was ten or eleven.

WATERS: Okay. So you'd been moved around previously?

COOPER: Yeah.

WATERS: A couple of times. All in California, though?

COOPER: All in California. Yep.

WATERS: Okay. Got you. What was growing up in California during that time like?

COOPER: It was great. I mean, well, moving from Riverside to San Luis Obispo was funny, because it's like 120 degrees [Fahrenheit] in the summer. In Riverside, it's out in the desert and then San Luis Obispo is on the coast, so it's like 70 degrees [Fahrenheit]. So the first few weeks we were freezing. I remember we were the only ones wearing jackets in August in San Luis Obispo.

San Luis Obispo is a great place to grow up. **<T: 05 min>** It's one of California's coastal towns. It wasn't too large. It was an interesting town, because about half the population were students at either Cal Poly San Luis Obispo or Cuesta College, and the other half were residents, and most of them either had a business, or worked for the prison, the men's colony there, or worked for Caltrans. That's California Department of Transportation. For Pacific Gas & Electric [Company]. There was a power plant there.

WATERS: Got you. Is that Diablo Canyon?

COOPER: Well, I actually . . . originally, when I was a kid, Diablo Canyon hadn't opened up, although my first job after becoming an engineer was at Diablo Canyon Nuclear Power Plant. But no, there was a gas-fired power plant in Morro Bay, [California] which is just a few miles from San Luis Obispo. That was owned by PG&E. And then PG&E, I don't know if they already owned the land, they bought or owned the land, and they built Diablo Canyon, starting probably in the late 1970s, early 1980, I think it was in the late 1970s.

WATERS: So were you and your siblings close in age, and also in relationship?

COOPER: So we're all close in relationship. My sister's two years younger than I am, and my brother's seven years younger than I am. All of [us] are Cal Poly graduates. My sister's an industrial engineer. My brother and I are both electrical engineers. My brother actually works for PG&E in Diablo Canyon. My sister married and moved up to the Bay Area, and she works for a company called Advanced Micro Stepper [now Advanced Micro Systems Inc.]. The name actually is outdated now, because they make machines to make microchips, and that process is entirely optical now.

WATERS: So having driven through San Luis Obispo a few times, it's a kind of—not sleepy, but it's like a surf town, almost.

COOPER: Yeah, a little bit. It's got the famous Madonna Inn, for those of you that know like *The Newlywed Game* or *The Dating Game*.[1]

WATERS: That's close to Morro Bay, correct?

COOPER: Yeah.

WATERS: Yeah. Beautiful area.

COOPER: Yeah.

WATERS: So did you surf at all, growing up, or was that a part of your life?

COOPER: No. The water up in San Luis Obispo is cold, right? It's 50, 60 degree [Fahrenheit] water there. I mean, I tried surfing a couple of times. You have to have a wetsuit to surf up there. Surfing's kind of more—well, there's a surfing kind of culture up by Monterrey, [California]. I liked to—I was a runner as a kid, and I ran track and cross-country for Laguna Junior High School and San Luis Obispo Senior High School in San Luis Obispo. For me it was more fun to run along the beach. Pismo Beach is a beautiful, long, flat beach in California. Now actually, the beach between Morro Bay and Cayucos is about five miles apart, nice, beautiful beach. Just below Morro Bay, there's the dunes, or even in Nipomo, [California], that area, there's some dunes, so you can do some hill running. It's a nice area, too, because San Luis Obispo is kind of in the valley, and there's hills surrounding it. So it's just a beautiful countryside.

WATERS: Did you spend much time in the outdoors as a kid?

COOPER: I did. I was very active in the Boy Scouts. I actually became an Eagle Scout. We had a great scout troop, troop 319, and we would do a lot of camping in that whole area. Plus we had Camp San Luis Obispo and Camp Hunter Liggett, the military bases. They were very

[1] Originally created by Nick Nicholson and E. Roger Muir, *The Newlywed Gam*, directed by Bill Caruthers and John Dorsey, airing from 1966-1974 (Los Angeles, CA: Chuck Burris Productions, Los Angeles, 1966-1974)

supportive of a lot of Boy Scouts to camp. There's the Cuesta Ridge, and there's great hiking trails there, Los Padres National Forest, Lopez Lake. I don't think you can live in San Luis Obispo without being some kind of outdoor person.

Even when we moved back there after I got injured in the [United States] Army, we—and even to this [day], you know, we love—my wife and I, we love to bike, and swim, and do triathlons, and things like that. It's just that kind of culture. The weather is kind of ideal for being outdoors almost all year long.

WATERS: You mentioned running. Was that just a natural progression from being a kid? Why did you start running?

COOPER: I mean, I started, actually had started in Riverside. You know, they had like some school track meets and things like that. My grandfather entered me into some of the like city—**<T: 10 min>** little city races for kids. When I went to San Luis Obispo, [I] was always good in science, and our science teacher happened to be the track and cross-country coach. Of course, he pitched to the kids in science class. Most of them sort of groaned and . . . . [laughter]

I thought, "Yeah, I'd like to go out. I'll go out and try." I'm kind of unusual, I guess. Maybe not today, but when I was growing up, scientists kind of had the *Big Bang Theory* stereotype.[2]

And so it was a little bit unusual to like science and engineering and also like sports. I liked it. So when I started in junior high, and did it in high school, and ran in the Army, and still do marathons and things like that today.

WATERS: Going back to like grade school, were you a good student?

COOPER: I was not a great student in grade school, because I had dyslexia, and I was undiagnosed, and I had an astigmatism, so they actually—I think it was in fifth grade—they did an IQ test, and I scored very high, and they were like, "Well, this doesn't make any sense. How can he score high on the IQ?" Then so they actually wound up having me—sent me to get my eyes checked, and to a learning specialist, and they [said], "Oh. He needs glasses and he has dyslexia." Then my grades turned around.

WATERS: Was dyslexia recognized . . . .

[2] Chuck Loore and Bill Prady, *The Big Bang Theory*, directed by Mark Cendrowski, airing from September 24, 2007 to present (Burbank, CA: Warner Brothers Television, 2017).

COOPER: I don't know if dyslexia was a recognized diagnosis at the time, but I think it was diagnosed as a reading difficulty.

WATERS: Got you.

COOPER: I had like a reading tutor for a couple of years. The classes helped quite a bit. If you have astigmatism and everything's kind of fuzzy, reading is not a popular thing to do. You wonder why you fall behind in your reading, but it's a lot harder for you, and you get a headache pretty quickly. Then on top of that, having dyslexia, then. But once I got the glasses and worked on my reading, I learned some compensatory strategies, and it got a lot better.

WATERS: Can you talk about those? What kind of strategies would you use?

COOPER: Just reading more carefully, and also not just trying to read the words, but reading the context, right? What does it mean?

WATERS: Got you. And so your grades improved as you [used these strategies]?

COOPER: Yeah, after that, it was fine.

WATERS: You were fine?

COOPER: Yeah.

WATERS: So in high school, you got [good grades].

COOPER: I got good grades in middle school and high school. Yeah. Yeah. I'm not—I wasn't, you know—my sister was a 4.0 through all middle school and high school, so it's all relative. I liked to do sports and Boy Scouts and other things. Yeah, my grades were—I think I graduated high school with like a 3.3, 3.4. But I got a 4.0 in my junior/senior year, so I could do it if I applied myself. I also knew I was planning to join the Army. But I did all the college prep classes, for the UC [University of California] system. I knew I eventually wanted to go to college. I knew I had good enough grades to get into the UC system.

WATERS: You naturally tended towards science as a kid?

COOPER: Yeah. Yeah.

WATERS: What is the root of that, do you think? Where did that . . . or is that more engineering, with your background with your family's business?

COOPER: I don't know.

WATERS: Yeah?

COOPER: I don't know. I liked the science, probably. Well I had some advantage because of my parents' business. My grandfathers were mechanics, too. So that helped. I grew up working on things. But I think probably, it really [was] probably that I had good teachers in middle school and high school, good science teachers, and they made it fun.

WATERS: Do you remember specific teachers?

COOPER: Yeah. Mike Aiello, Ron Hanley, Brian Waterbury. They were . . . .

WATERS: Which one was your track teacher, or your track coach?

COOPER: Actually, it turned out **<T: 15 min>** Brian Waterbury and Ron Hanley were both track coaches. Brian Waterbury is kind of the one that recruited me and got to me. He was the long-distance coach. Ron Hanley, he was a hurdler and sprinter coach, but he was like our physics teacher. Waterbury was actually a math teacher, and Mike Aiello was a biology/chemistry teacher. The other thing is that they had all just gotten out of school when I was going into middle school, so the age differential wasn't that great. They were really engaged. They were trying some new things. I liked it. When I moved to high school, Waterbury moved to high school—he went from the middle school to the high school. And then the other track coach at the high school was a guy named Bruce Smith, who was also a science teacher, a little unusual, actually, that your—a lot of times the coaches are from the physical education department, or some other department, not science teachers. Maybe the track coach or something might be a little different, and they were good teachers.

WATERS: What was your specialty in track?

COOPER: Long distance in high school. I think in middle school I did the half-mile and the mile, and then in high school I did the mile and the two-mile, and I ran cross-country.

WATERS: What else? Were you doing other after-school activities?

COOPER: So I wrestled for a while as well.

WATERS: How did that go?

COOPER: Good.

WATERS: Yeah?

COOPER: I eventually was a good wrestler as well. Then I also was in the chess club, and we had a great chess team. Actually, Steve Jacobi was on our chess team. He went on to become the US National Amateur Chess Champion.

WATERS: Even then he was amazing, I imagine?

COOPER: He was amazing, which was great, because, you know, it's the first top four players that count in a chess team, and if you have a guaranteed win, that's not bad. Kind of set . . . makes life a little easier for the rest of us.

WATERS: I did want to ask, too, about your dad. At what point in your life did he become a professor?

COOPER: I was in 6th grade.

WATERS: Okay. Do you remember him . . . did he ever bring his work home with him? Or did he ever take you to the university? Were you exposed to that?

COOPER: A little bit. My sister more so than I was. I mean, the university in San Luis Obispo was already kind of engaged. I got third place I think in our science fair, and it was hosted at the university.

MARTUCCI: What was your project?

COOPER: I designed a motorcycle. I had a little handmade model I made of it, and all the drawings I had done. That was another hobby of ours, was motorcycles.

MARTUCCI: Building one?

COOPER: Yeah, building them, riding them. Yep.

WATERS: You mentioned you were an Eagle Scout.

COOPER: Yeah.

WATERS: What was your project?

COOPER: My Eagle Scout project was to design a part—well, first to save the land around this lake near my home called Laguna Lake, and to have the city buy the land and create a park. So if you look in the *Telegram Tribune* from those times, back in the microfiches, and you'll see my name a lot, fighting a developer from Los Angeles.

WATERS: And you were eighteen probably, at the time, around there? Younger?

COOPER: No, I was like twelve, thirteen.

WATERS: Oh, nice. Even younger.

COOPER: I went to the planning committee meetings, and the county commission meetings, and the city council meetings, arguing that there was enough development around the lake already, and that the city should buy the land. And I won. They did. They built a park. The park is still there today.

WATERS: Nice.

MARTUCCI: What year was that?

COOPER: Nineteen seventy-two, '73. The title of my Eagle Scout project is "This is Our Lake."

MARTUCCI: Did you feel an affinity with the environmental movement that was sort of building at the time?

COOPER: I did. As a matter of fact, part of my Eagle project was I created a multimedia presentation using 35-millimeter slides and movie film. I coordinated it all with a punch tape computer, so that it would have . . . like have voiceover, and then slides would show, and then the movie would come, and the movie clips, they would stop the slides, the movie clips **<T: 20 min>** sound would come. And I think that's probably . . . one, I think the developer just couldn't believe that I would show up to like two years of planning commission meetings and county commission meetings and all that stuff, and city council meetings to voice my opinion against him. But I got the schools—the high school, the two middle schools, and all the grammar schools—to let me show this multimedia presentation, and then we showed it to the city council, the county commissioners, and . . . .

WATERS: How did you acquire the skills to make that presentation? It sounds pretty complicated.

COOPER: Yeah. It was kind of interesting. When I was in seventh grade, I was the—what they called the assembly commissioner for our middle school—and that's . . . so you kind of organize the school assemblies. I was getting ready to set up for an assembly, and this guy was tearing down from this seminar, workshop he was doing for the teachers, on using multimedia in education, and he was from the San Luis Obispo County School District. I was fascinated by all the technology, and so I got his name. I convinced my mother to take me over to the county schools' offices to see. He had been doing these—they bought this equipment—but nobody had he was trying to convince teachers to do it. Teachers are busy, and there was a pretty steep

learning curve on this. It kind of was sitting there. I convinced him to let me use it, so to teach me how to use it, and let me use it for my Eagle Scout project.

WATERS: So you were a pretty bold kid?

COOPER: Yeah. [laughter]

WATERS: And you must have had very supportive parents. They took you to all . . .

COOPER: Yeah.

WATERS: . . . these meetings, and then they took you . . . .

COOPER: Actually, my parents didn't take me to the meetings. A friend of my parents did. He was a World War II vet, a guy named Charles Dills. He was a P-51 fighter pilot in World War II, and he thought it was just—he was an Eagle Scout, too—and he just thought it was being a World War II vet, and serving in Europe, and he thought it was a great civics lesson, right? My parents were like, well, if you want to go, and Charles wants to take you, have fun. [laughter]

I think Charles just didn't . . . up until the day he died, he was the kind of guy that would write letters to the editor and things like that. I think he just thought . . . I think he had a good time just seeing me being an environmentalist and fighting the fight. Yeah, so that's that. It turns out it worked. I showed my movie, and then they actually did some[thing]. Then the guy that I was working with convinced the school district that maybe we shouldn't be selling this to teachers, we should be talking to the students. They offered an after-school program after that, and so he and I went, and we taught some other kids how to use it. We actually, after I showed my movie to the city council and the county commissioners, they asked the middle school, and I was part of the group, to do one about our city and our county. Just kind of like a promotional thing to promote the city and the county.

MARTUCCI: Can I ask a quick question?

WATERS: Yeah.

MARTUCCI: I'm also curious, because of your interest in engineering and mechanical things, were you paying attention and interested in the space program that was going on?

COOPER: Oh, yeah, of course. Yeah. I mean, that was a big motivation for me, although . . . and fearful, too, because I watched the—let's land a man on the moon—watched Neil [A.] Armstrong, and I was blown away. I was still in grammar school at the time. It kind of made me want to be an engineer. On the other hand, in the seventies NASA's [National Aeronautics and Space Administration] space program reduced considerably, and they were laying off a lot of engineers. Your guidance counselors were like saying, "I don't know. You ought to **<T: 25 min>** think about other things, or it's hard to find a job for engineers now." And then it all worked out.

WATERS: I know that you went to the Army immediately after high school, correct?

COOPER: I did. Yeah.

WATERS: We'll come back to that, but briefly, was it always expected in your family that you would go to college, that you and your siblings would go to college?

COOPER: It was expected of my sister.

WATERS: Right.

COOPER: I don't think it was expected of me. I think my parents were sort of ambivalent, whether I went to college or not.

WATERS: Did they push you in any direction as far as what to do with life?

COOPER: Just to get on my own and be independent.

WATERS: Right.

COOPER: I knew I wanted to go to college, and I actually knew I wanted to study engineering, but the Army was a way to become independent, serve my country. I was influenced by my great uncle Mickey Munn, who served in the Army, and my dad, Charles Dills I'd mentioned. My Boy Scout troop leader, Mr. Henry, was a Vietnam veteran. Some of my

high school teachers were Vietnam veterans. Some of them were World War II veterans. So I felt like it was important to serve.

WATERS: At what point . . . how early in life did you realize that that was an option and that it was something you wanted to do?

COOPER: Oh, I think I knew when I was twelve, thirteen years old, right, that I was probably going to do that. Then look at what my options would be, stay on, go to college, come back as an officer. I knew I didn't want to go to college first. I wanted to see if I could see a little bit of the world.

WATERS: Right.

COOPER: Be able to have a little more. Get a little more mature. If I was going to join, make a career of the Army as an officer, have served as an enlisted first, get an idea . . . that was something I wanted to do. So those were . . .

WATERS: Was there a JROTC [Junior Reserve Officer Training Corps] program at your high school?

COOPER: Yep.

WATERS: Were you involved with that?

COOPER: Nope, I was not.

WATERS: Not at all? Why was that?

COOPER: I liked sports, and well, we had a family business, and then I had sports, and then I had school, and that took seven periods. And Boy Scouts. There're just only so many hours in the day.

WATERS: Got you. So what was the process of signing up for the military?

COOPER: That was easy. I just signed up to take the ASVAB, and that's the Armed Services Vocation Aptitude Battery.

WATERS: How did you do on it?

COOPER: I did very well.

WATERS: [Did it] push you towards engineering?

COOPER: I could do anything, with my score on the ASVAB. Of course, when you do that, the recruiters start calling. You take the ASVAB at all, they start calling. You take the ASVAB and score in the upper ten percent, they call all the time.

WATERS: So what were those conversations like? They were just pulling you in different directions as far as options that you had?

COOPER: So it was really a tussle between the [United States] Marine Corps and the Army.

WATERS: Right.

COOPER: And I was kind of time-limited, because it was in 1976. If you joined in 1976, you'd get the GI Bill from the Vietnam era. If you joined after 1976, you'd get the Montgomery GI Bill. It wasn't nearly as good. Really, for me, the hem and hawing was a little bit more between Army and Marine Corps, and the other hemming and hawing was where could I go, choice of assignment, choice of MOS, military occupational specialty. There were a few months of negotiating back and forth.

WATERS: Did you have family members and those other veterans that you mentioned in your life, were they pushing you in any direction?

COOPER: Nope, not really.

WATERS: So mostly your . . . .

COOPER: To them, it was just more about, you know, yeah, it's a good thing, you're a young man, you should go give some time to your country.

WATERS: Yep.

COOPER: But you've got to figure out what you want to do.

WATERS: So what did you decide on, as far as your role in the military?

COOPER: Unfortunately, you know, I took the ASVAB like in October [or] September, and that's not really a good time to take the ASVAB, because the jobs start to fill up over the course of the [year]. They go on the calendar year, so a number of the types of jobs—I was trying to get something in electronics. I also didn't want to enlist for four, five, or six years. The Marine Corps basically said, "Well you just join the Marine Corps. We'll tell you where to go. We'll tell you what to do. Your scores are really good. You'll likely get what you want, but . . . ." I said, "All right, so **<T: 30 min>** I'll go to the Army."

The Army said, "Well yeah here's a list of things, and you qualify for everything, but I need people in these things." They could offer you a duty station. I opted for Europe. I said, "If I'm going to do this, I'm going to go and see something." That kind of restricted my MOSs. So I wound up being what they call a unit armorer, which is basically the person that repairs the weapons. It was pretty easy for me, because I had the background in, the mechanical background and aptitude.

WATERS: Right. So weapons being small arms.

COOPER: Yep. Like the pistols and machine guns and hand grenades and those things.

WATERS: What kind of specialized training was that? So you had basic training, and then you had to go . . . .

COOPER: Yeah. This is in the logic of the Army. I was enlisted in California. I could have gone to Fort Ord for basic training. But no, the Army sent me to Fort Dix, New Jersey, forty years ago this week.

WATERS: Nice. What was that time like? I mean, I imagine it was very exciting.

COOPER: Yeah well, you know, they put you on a pair of yellow footprints, like those on the floor over there, which a friend of mine gave me to remind me, although if you notice, those are Marine Corps yellow footprints. He was a Marine colonel, to remind me that I went astray. [laughter] And they start yelling at you, right? You're sleep deprived. They cut all your hair off, take all your clothes away, take all your money away, and give you new clothes, and a whole new name. That makes you wonder what you got yourself into. You're pretty far away from home, right? But now you kind of learn to go with the flow. After a few days, it's—well, it took me—after you kind of get over the initial shock and sleep deprivation, you realize that lots of people have gone through this before. It's a process.

WATERS: You're not special?

COOPER: Yeah. Then you also sort of realize that you just do what you're told. You don't question. You just do what you're told, right? I was in great shape, so that wasn't an issue for me.

WATERS: Prior to joining the Army, had you spent time away from home at all?

COOPER: Yeah, I'd spent some summers with my grandparents, and we had vacationed with my grandparents. At Boy Scout camps. I didn't really have any real separation anxiety from my parents. That for some people is a hard thing. Yeah. And of course, when I was in, there was no Skype or email or texting. You couldn't even call home. You basically could write letters. I'd write a letter once a week or so.

WATERS: And what was your family's reaction to you wanting to join the military? They were all for it?

COOPER: They were fine.

WATERS: Yeah?

COOPER: Yeah.

WATERS: Was there any concern, Vietnam had just ended, correct?

COOPER: Yeah.

WATERS: Was there some concern there? Well, the war was over, but joining the military is always hazardous that way.

COOPER: They never expressed it to me. I mean, there was a lot of hostility towards the military at that time. I think my parents were, "You've got to do something with your life. This is a good thing to get started." Yeah, they didn't really pressure me one way or the other. It was good for me. The military has still been good to me.

WATERS: Yeah? You go to basic training. How long does basic training last?

COOPER: Mine was about ten weeks.

WATERS: Okay. Does that include specialized training for your job?

COOPER: Nope.

WATERS: That's extra?

COOPER: That was just basic infantry training.

WATERS: Where'd you go after that?

COOPER: Fort Jackson, South Carolina.

WATERS: What were you doing there?

COOPER: It was my first exposure to New Jersey, and first exposure to South Carolina, which also there was the first time I saw Washington, DC [District of Columbia], because the Army's an interesting organization. I was seventeen years of age. I couldn't even go to Europe yet, because you had to have been eighteen, because Europe was a forward deployment, because of the Cold War, and the ten divisions of Russians sitting on the border. They gave me a train ticket, drop me off at the train station, and said, "You're going to go to DC. You've got a layover there. And then you've got to get on another train, and you have to go to," I think Charlottesville. Jacksonville, South Carolina, I think it is, or Charlottesville. I'm not sure exactly. Right outside Fort Jackson.

Actually, we had a layover, so in my Army uniform went walking around, and saw the Washington Monument and the stuff on the mall. Got back on **<T: 35 min>** the train. Kind of interesting, that they have the faith that you have the wherewithal to actually get where they want you to go.

WATERS: Had you gone, you were with a group on this trip?

COOPER: Yeah technically. Right? They gave all of us train tickets, and some people were going to like Fort Bragg, North Carolina, and Fort Lee, Virginia, and . . . .

WATERS: So were there people that you went through basic with that were doing the same thing you were, that were going to go get the same [location]?

COOPER: Oddly enough, no.

WATERS: Just you?

COOPER: I actually joined on the buddy system with a guy named Matt Moore, and he wound up going to Fort Lee, Virginia, and I wound up going to Fort Jackson. You're supposed to go through the Army together. So much for that. Even when we got to basic training, he was in . . . I was in one battalion and he was in another. So we might see each other on the parade field walking by, and that was about it. I just kind of went with, you know, go with it. Fort Jackson is where I learned how to do small weapons repair.

WATERS: How long was that training?

COOPER: That was about eight weeks.

WATERS: You stayed there after the eight weeks? Or were you deployed elsewhere?

COOPER: So I was supposed to go to jump school, and then that kind of fell through. Then I was supposed to go to Fort Polk, Louisiana. That's when I went to talk to my company commander and said, "Now well you know, sir, when I signed up, I said I waived my . . . I chose this MOS so that I could go to Europe, and now you're sending me to Fort Polk, Louisiana, and I think we have a deal here." [laughter] Got in a little discussion about questioning the wisdom of the Army. I kind of said, "Well a deal's a deal, right? Most people didn't want to go overseas, so it's like you should be happy that I'm volunteering to go overseas."

I had to hang around for a little while, and then he said, "Well you can't go overseas. You're not eighteen."

I said, "Well then, why don't you send me to jump school?"

He said, "All right. I'll put you in for jump school." Then he came back and said, "Now your recruiter called and said he'd like you to come back home, and then do a hometown recruiter program. We're going to send you back to California until you turn eighteen, to work with the hometown recruiter."

WATERS: Was that common that they would send people back home?

COOPER: If you were smart and a good kid, yeah, they'd send you back home. I mean, there was usually one in the recruiting office that was a hometown recruiter. Yeah, the idea was that there would be somebody in the office that had just graduated from high school, and might even know you, right? I mean, I graduated in June, and I was back there like in October, mid-September, October. Of course, I knew a lot of the kids in the high school, and a lot of the kids and all the freshmen at the community college who had been at the high school. I went to like school assemblies, and then worked in the office.

WATERS: But you had in no way expected that that would have been your job?

COOPER: No, no. I knew that was a temporary job.

WATERS: Okay. How long did that last?

COOPER: Until I turned eighteen.

WATERS: And then you . . . .

COOPER: Then I got my orders, you're going to Germany. I turned eighteen in November, and they sent me to Germany.

WATERS: Where did you serve in Germany?

COOPER: First, I went to what they call a repo depot, replacement depot. It was an old prison in Frankfurt. I was there for a few days, and then the same thing. They gave me a train ticket and said that "You're going to go to Worms."

And they said, "Oh, well, you're . . . ." because I was an Eagle Scout, and I had done the hometown recruiting, I got promoted, so I was one rank above most of the people in the repo depot. They said, "You have to drop these people off at these bases, and you're the last guy on the line."

That's the thing about the Army. You're the highest-ranking person, you're in charge, even though you're like only one step up from the bottom rung, you are in charge of the guys on the bottom rung. That's okay.

I dropped those guys off. I got to Worms, Germany. Martin Luther's trial was held there, the Diet of Worms. I got there, and there's nobody there. Every other base, every other train station, there's somebody there, pick the guy up. I handed them over, gave them their orders, and they signed off. I went on to the next and took the next guy. I get to mine, there's nobody there. [laughter] I didn't speak German, and I went to somebody in the train station. I said, "Where's the Army base?"

They just said, "Out that . . . **<T: 40 min>** out the door, the first street, make a left, and keep walking." I had my duffel bag, and my overseas bag, and I hoped it wasn't twenty miles away. [laughter] It turned out it was a couple of miles down the road. I got there, and I was on the backside of the base, but I didn't know how big the base was, either. I just climbed the fence, threw my bags over the fence, and climbed the fence.

WATERS: Were they supposed to send someone for you?

COOPER: They were. But communications weren't great at the time, and there was no way to like call or anything. Just found the MPs [military police], showed them where I am, this is my orders, this is where I'm supposed to go. They're like, "That's three buildings over on the left. Go knock on the door." By that time, it was like 11:00 on a Friday night or something like that, and so. Yep. Went in, "That's you, all right, we've been expecting you." "That's nice. How come nobody was there to meet me?" "I don't know. We were . . . ." I think they were expecting me the next day. Somehow, they got the orders.

WATERS: Got you.

COOPER: I showed up a day earlier than they were told I was going to be there. That's fine.

WATERS: What was your assignment on base there in Germany? I guess the larger question is how large was the military presence in Germany at the time, and what was the mission? What was going on at the time?

COOPER: About five hundred thousand people at the time. It was the Cold War. Our mission was to deter the Russians from attacking Western Europe, basically, right? I was assigned to a unit called 3rd Ordnance Battalion, 59th Ordnance Brigade, 32nd Air Defense Artillery Command, which our unit actually oversaw Pershing missiles, so short-range, medium-range nuclear missiles in Europe.

WATERS: And what was [your assignment]?

COOPER: My job was to make sure that all their machine guns and stuff were in good working order if anything bad happened.

WATERS: Got you. What was life like on base, or off base, in Germany?

COOPER: So it turns out that the base I was on, I could have walked around to the other side. It was about a square mile of space. It was not very big at all. About fifteen hundred of us were on the base. There were two types of soldiers there. There were the barracks rats that basically just lived on base and complained about how miserable it was that they were in Germany, and there were those of us that walked out the gate to see what was on the other side. [laughter]

WATERS: How often did you guys go off base?

COOPER: My friends and I, we went off-base several times a week, most weekends, every chance we got. I mean, as a runner, I'd go off base every single day to run. It was pretty boring, running around the one road around the one perimeter road around our base. Even going to the gym was off-post. I was off-post all the time.

WATERS: How large was the town where the base was located?

COOPER: Worms was about fifty thousand people at that time. It's about seventy thousand now. I took German classes, learned German, and I actually married a German girl. We've been married for thirty-five years.

WATERS: You guys met there in . . . .

COOPER: Yep.

WATERS: Nice. How did you meet her?

COOPER: At a German-American Friendship dance.

WATERS: Nice. Was that a . . . ?

COOPER: Her sister introduced us.

WATERS: Did she speak English?

COOPER: Nope.

WATERS: You spoke enough German?

COOPER: Yep.

WATERS: How was learning German?

COOPER: It's difficult to get started, but because it's very rule-based and very strict. On the other hand, English is a Germanic language, so once you understand German, you understand English better. But English is a very forgiving language. Especially Americans we kind of let . . . you can throw a bunch of words out there, and most people will sort of figure out the meaning and let you get by. Germans are . . . it's got to be done properly. I learned pretty well. I was lucky that back in the late seventies, early eighties, you could still speak German, and then Germans would speak German back to you. Our nieces and nephews, they speak German to me because I speak German fluently. We speak German at home. But if our American friends come over, they speak English to them right away. Because they have English in school starting in like the fourth grade. They watch American TV. They're on the American internet. They don't even have an <**T: 45 min**> accent.

WATERS: So you met your wife. How long before you guys got married, after you met?

COOPER: Three years.

WATERS: So you guys dated for, you were there the entire time?

COOPER: No, I got injured in part of that time, got sent home, so that kind of messed up our courtship for a while.

WATERS: How long were you in Germany before you got injured?

COOPER: I was in Germany for three years before I got injured, but almost three years, and then we had been dating for a year when I got injured.

WATERS: Okay. You want to take a break?

[. . .]

[END OF AUDIO, FILE 1.1]

WATERS: We were discussing your time on base in Germany. Did your job change at all the entire time you were there?

COOPER: Yep. I was there about a year, and the Army started a program to help build German-American relations. It was part of the anti-terrorism activities in Europe. At the time, there was a lot of terrorism, Baader-Meinhof, Red Army Faction, Red Army Brigade, basically, Russian and East German-sponsored terrorism in Western Europe. It actually turned out to be bigger than we actually thought it was at the time. After the Wall came down, they were able to go through the records of the Stasi and the East German government, and they thought out there were many more spies than we had thought there were, and many more things that the Russians and East Germans were responsible for than they were getting credit for at the time.

I guess it's like now, with the Russian hacking stuff. As they dig into it more, they realize that a lot more stuff has been . . . they've been doing it longer and more than they thought they were.[3] They changed me to what's called Civil Affairs, which is our military-to-military, military-to-civilian relationships.

WATERS: Okay. What kind of work were you [doing]? What was your day-to-day like, doing that thing?

COOPER: My day-to-day was cool. They took me out of uniform, put me in civilian clothes. They taught me German fluently. They sent me to an immersion school. They taught me about German culture and heritage. Taught me about conflict resolution, group dynamics, individual dynamics. I got to do all kinds of things, German-American festivals, German-American joint training, working with the German police, going with our commanding general to various events, translating.

WATERS: I imagine you got to travel throughout Germany doing this?

COOPER: I did. It was awesome.

WATERS: Nice. That was a new position, you said?

COOPER: That was a new position. Yeah.

[3] Jim Rutenberg, "RT, Sputnik, and Russian's New Theory of War," September 13, 2017, *New York Times Magazine*, https://www nytimes.com/2017/09/13/magazine/rt-sputnik-and-russias-new-theory-of-war.html?_r=0.

WATERS: Was that created not for you necessarily?

COOPER: No, no. It was a new program, and I was selected to be part of that program.

WATERS: Okay. So at what point did you meet your wife?

COOPER: Through that program, basically. Yeah. The German-American Friendship dances were one of the things we organized. Her sister had been coming to some of the activities that we had organized, and she brought my wife, and then she introduced us, we met, and started dating.

MARTUCCI: What year was that?

COOPER: Nineteen seventy-nine. July of seventy-nine.

WATERS: And how common was that, for American military personnel to [date Germans]?

COOPER: It's not uncommon, but it's not that common. I mean, I was going to be over there for three years, at eighteen years of age. There were two women on our post. It was either a long period of abstinence or going outside the gate and seeing that half the population out there is women. In here, it's fourteen hundred and ninety-eight to two. You know, I told you I was a fairly smart guy. I could figure out the odds were a little better on that side of the fence than on this side of the fence.

WATERS: And at the time, was that your first time in Europe?

COOPER: That was. Yep.

WATERS: So you were a young kid exposed to a whole new world.

COOPER: I was.

WATERS: What was that like?

COOPER: That was awesome, actually. I think it shaped my whole life, really. You can see that people, different government, different language, different culture, and it works, right? They have families and go to work and go to school, and have lives. You start to say, "Oh, well, you know what? There's different ways of thinking, different ways of doing things, and it works out."

WATERS: Did you get to travel throughout Europe?

COOPER: I did. Since I was a good runner, I got on the US Army Europe track and cross-country teams. I got to go to Spain, Italy, France, Austria, Switzerland, Belgium, Netherlands, and the UK [United Kingdom]. It was pretty awesome. All over Germany.

WATERS: And those were competitions?

COOPER: Yeah, different competitions. Yep.

WATERS: Were they friendly competitions amongst military <**T: 05 min**> personnel?

COOPER: Yep. They were military to military to competition. And then we also . . . our military divisions and civilian competitions, a little bit of both.

WATERS: That's cool. I didn't know they did that sort of thing.

COOPER: They still do. Actually, it's a program called CISM [International Military Sports Council]. I don't know what it stands for. It's like Congress International Sports, something like that. It's a French name that's been sort of converted to English. That's what it does. It [facilitates] military cooperation and collaboration through sport.

WATERS: Nice.

COOPER: So I got to participate in some of their activities.

WATERS: It was in 1980 that you had your accident?

COOPER: Yep, July 23, 1980.

WATERS: Do you want to talk about that?

COOPER: I had some knee injuries, and so I was doing—the Army had to—what they call PT, physical training. Instead of running, I was bicycling. That day, I had picked up my bicycle from the shop. I think I had to get a new rear wheel. I went to have lunch with my wife at her parents' house, and I was going to ride my bike with her to work. She was studying hotel and restaurant management, or doing her apprenticeship in hotel and restaurant management at a hotel about fifteen kilometers away. I got delayed, because I was having some trouble with my bicycle, and I was trying to get it running. Her brother was on a moped, so we started off afterwards, after her, and we came into this city called Frankenthal, [Germany], where the hotel was. I was going down the bike lane. There was one of these cutout bus lanes, bus stops, and there was a bus letting off passengers. He didn't clear his left. He didn't see that I was on the left-hand side. So he sort of pushed me basically right into the oncoming traffic, and unfortunately, there was a German Mercedes semi-truck coming in the oncoming traffic, oncoming lane.

It hit me head-on, and basically, I hit the left front side of the vehicle. Bounce on the ground, the front wheel rolled over my chest, caused me the spinal cord injury, plus a lot of broken bones and internal damage. I lay on the street, and I thought, "Ah shit, I can't walk," and kind of passed out. Then an ambulance came. I remember I was in the ambulance. And the ambulance driver kept asking me, "Trainierst du viel?" which means, "Do you exercise a lot? Do you do a lot of sports?" I managed to nod and say yes, and then I think he was looking to see why my blood pressure and heart rate were so low.

The ambulance took me to a local hospital, and they actually thought I was dead, I wasn't going to make it. But they had a doctor come by to check, to certify. I grabbed his hand and looked at him, and the doctor called for a trauma helicopter and had me evacuated to the Ogersheim Unfallklinic, which was created to support BASF [Corporation].[4] They have a large BASF factory and chemical plant there. They needed a trauma center, for a Level I trauma center, if they had burns, fires, or explosions. So they flew me via a life flight helicopter to the trauma center, and a young Doctor Ungemach spent probably the next week to ten days at my bedside, taking care of the internal bleeding, and trying to stabilize me.

[4] A German chemical company.

WATERS: What was the most serious of your injuries?

COOPER: The bleeding, internal bleeding. Yeah. I collapsed my lungs and a number of other bleeding organs.

WATERS: And broken bones as well, you said?

COOPER: Yeah. Well, the spinal cord injury is the most severely lasting injury, but that wasn't life-threatening at the time. Once he got the infections . . . . I was in intensive care for about six weeks. The **<T: 10 min>** Army sent a life flight helicopter to evacuate me to a Frankfurt Army hospital.

WATERS: Okay.

MARTUCCI: Do you have any lasting organ damage from all of that?

COOPER: I've recovered pretty well, actually. I didn't lose any organs. Normally, you might lose a spleen or something like that. But I didn't lose any organs.

WATERS: You spent the first six weeks in a local hospital? And then you were sent to an Army hospital.

COOPER: Yep.

WATERS: Okay. At what point rehab comes into play?

COOPER: I spent some time in the Army hospital. I had to get stabilized enough to get a Medivac flight out, and they have to work out what they're going to do; where are they going to fly you to and what are they going to do with you. They put me on a . . . so the [United States] Air Force flew me on a Medivac flight out of Frankfurt. That was kind of interesting. There were two of us with spinal cord injuries on the plane, one female soldier and myself. She had had a motorcycle accident. We asked if we could look at each other half the time and look away from each other; we're in what's called a striker frame. The striker frame is basically you're sandwiched between two cots, then you have like a hole cut out for your face, and those cots rotate on the end, like a barbecue spit. So they can flip you down, flip you up. And that's to

keep you from getting pressure ulcers. They have you on your face, have you on your back, have you on your face. We said, "Can we be half at least talk to each other for part of the flight?" "No, no, you can't fraternize. You have to be looking away from each other." Then we finally said, "Okay, we won't fraternize. We can just blink at each other, basically." They said all right. Then what they do is they induce you into a medically induced coma, and so it didn't matter. The whole argument was for naught. They could have just said, "We're going to knock you out anyways. It doesn't matter." I never saw her again.

But then we landed in Andrews Air Force Base, [Maryland], and then they put us on a beautiful Bluebird bus, like the old school buses, painted like a sky blue, and drove us to Walter Reed [Army Medical Center]. I stayed there for a few days. My parents—when I was in intensive care, without me knowing—had convinced the Army to send me to a civilian hospital near home. I stayed at Walter Reed for a while, and then the Air Force medivacked me to Vandenberg Air Force Base, [California], and then I took an ambulance to San Luis Obispo. I had to have a few more surgeries, got registered with the VA [Veterans Affairs] in Santa Barbara, [California], and I went, of course, they had these nurses come and tell you about where you want to go to rehab[ilitation].

I'd had heard bad stories about the VA, and so I opted to go to a Santa Barbara rehab, which I wasn't very satisfied with. I tried to escape on the first day. Finally, the doctor sat down with me—we talked about what [I] needed to do to get out of here—and so he said, "You've got to be able to get in and out of your wheelchair. You've got to be able to do a wheelie. You've got to be able to hop a curb. You've got to be able to drive a car. You have to be able to walk on long leg braces. You've got to be able to cook a meal. You've got to be able to brush your own teeth, go to the bathroom, take a shower, all that stuff. Get in and out of bed, get dressed." We kind of came up with this checklist, and three weeks later, I was able to do all those things. I said, "I'm leaving. I want to go home."

MARTUCCI: What was the extent of your paralysis?

COOPER: I'm a T7-8. It's basically belly button-down. I went back to my parents for a while and started college. I got out in November of 1980, and I started at Cal Poly in January of 1980.

MARTUCCI: What about your not-yet wife, yet?

COOPER: She was still in Germany. She finished up school. She came to visit in the summer of 1981, and we did a vacation with my grandparents in their motor home and saw my grandmother in Michigan, a sort of cross-country trip, and then came back. Decided we were still in love and got engaged. I had to do all the paperwork to get her a green card, and . . . well, not to get a green card, to get permission to get married. It's called the fiancée visa. Fortunately, since I was in the Army when I got injured, and <**T: 15 min**> we met when I was in the Army, I

was able to get her under the War Bride Act of 1948, as long as I could get command approval to marry her. We went through that paperwork, and she was able to . . . I think we filled out that paperwork in like August of 1981 and we got approval in May of 1982. She came over, and we got married, first by the Justice of the Peace, and then we had a church wedding a month later.

WATERS: I did want to ask about your emotional state following the accident, and also the military. Do they offer—I'm sure they do—some form of counseling, to help the transition?

COOPER: At that time, they did not. Now they do a great . . . well, I don't know about great. It's a thousand times better than when I went through it. Now I was lucky. My friends in the military are actually still my close friends. They came to the wedding. Some of them, we're still friends today. My military unit—kind of at that time—it was sort of left up to your individual unit. Now the VA is much more proactive. Well, I didn't even finish; I was not happy with the civilian rehab, so I actually checked myself into the Sepulveda VA [Medical Center], and went through VA rehab.

WATERS: Why were you dissatisfied with the VA? Or with the civilian rehab?

COOPER: Because I started meeting veterans. They were like, "This is what you get from the VA. This is what they taught us to do, and here's how you use escalators, and here's how you can go downstairs." They have sports programs. I wasn't exposed to any of that. I went to the Sepulveda VA spinal cord injury rehab, and they taught me to swim and opened up a lot of other doors for me, helped me get into wheelchair racing.

WATERS: Hmm. So was there any form of counseling, as far as emotional . . . ?

COOPER: Yeah, there was emotional [counseling]. I had a social worker. Still have a social worker to this day. It's kind of a mandatory . . . I still get my care in the VA. They have a social worker that touches base with you.

WATERS: So was that extremely hard for you, being an athlete? Was that transition [hard]?

COOPER: It was. The transition was hard. A couple of things that really helped out: my grandparents were extremely supportive, and they were fully engaged in whatever I needed. My girlfriend still loved me and wanted to marry me. I had a goal to go to school, and I was able to go to school, and that was a big plus. I had some great veteran mentors, Tim Davis, the guy up in the picture there, was my peer mentor. He was injured in the Tet Offensive, a Marine. He was

able to kind of . . . he was a few years ahead of me, so tell me what life was like, and make some of those adjustments. And so yeah, you go through the whole why me, and depression, but what really helps is when you've got things to do every morning, and you've got to study, and you have friends, and people that can help you out.

WATERS: When you first came back, you were living with your parents?

COOPER: Yep.

WATERS: How long did you live there with them?

COOPER: A year and a half.

WATERS: Okay. Got you. At what point did you get married?

COOPER: May of 1982.

WATERS: Okay. While you were still with your parents?

COOPER: No, I got an apartment.

WATERS: Got you. Okay.

MARTUCCI: When you moved back to your parents, were there any modifications to the home that needed to be made?

COOPER: There were, but my parents didn't make them.

MARTUCCI: Okay. Were you . . . ?

COOPER: They said, "The world's not friendly towards people with disabilities. You should figure out how to make it work." Which actually helped a little bit when we had to rent

apartments and houses and things like that. You really couldn't make any real modifications. Then remember, there's no ADA [American with Disabilities], right? So traveling, I couldn't rent a car. There were no accessible hotel rooms. At that time, you really had to learn to fight for yourself. I wound up crawling on the floor a lot, I mean, that's where sports helped, too. You have to be flexible and strong, and it helps to be young.

WATERS: How old were you when you had your accident?

COOPER: Twenty.

WATERS: Wow. **<T: 20 min>** The transition back to living in California, did you know prior . . . . You planned to go to school. Did that accelerate going back to school? Your injury?

COOPER: Yeah. Of course. Yeah. What choice?

WATERS: What was the plan? To stay in the military how much longer?

COOPER: I was actually planning to go to school. I actually wound up going to school exactly when I planned to go to school. I was supposed to get out in June, and I had extended my enlistment for three months, because my replacement backed out, so they needed somebody to kind of fill the gap. I said, "All right." They asked me if I would stay on longer, so I extended my enlistment.

I thought about going to school in Europe or staying in the United States. I didn't get accepted to a German University. Well, I had not been accepted to the program by the time I got injured, so it was kind of a moot point at that point. But I'd been accepted to Cal Poly.

WATERS: Was that where your dad taught? Where did your dad teach?

COOPER: Yeah, he taught biology there. I was in the School of Engineering.

WATERS: So you did your bachelor of science in electrical engineering?

COOPER: Yep.

WATERS: You had already decided right when you entered that that was what you wanted to focus on, or was it . . . ?

COOPER: Actually, I planned to enroll as a dual major in mechanical and electrical engineering. I was kind of waffling, which one I was going to do. I took courses in both for the first two years, and then I started to realize that they're actually pretty similar, and I stuck with electrical because I thought it would have more of a future.

WATERS: Yeah.

COOPER: I don't think—it could have been the flip of a coin. It could. Either way. I mean, there're still plenty of jobs for mechanical engineers and plenty of jobs for electrical engineers. I do both today, so it worked out either way for me.

WATERS: How was the university as far as accessibility?

COOPER: So physically, they were not very accessible, but I will tell you, from a social perspective, they were awesome. Better than Pitt [University of Pittsburgh] today.

WATERS: How so?

COOPER: Well, when I first enrolled, my advisor said, "You're the first student we've had in a wheelchair in engineering. We're going to have to get the faculty together and decide how to modify the curriculum, and we'll see." I said, "Oh, you know what? I'd rather not. If you do that, then I don't think I'll be able to get a job, because I won't have the same degree as everybody else. I won't really be an engineer." His name was Saul Goldberg. We're still friends. Saul was like kind of, "Ah…." Then he goes, "I know you're right. This is really just an engineering problem. We should just figure out how to make it possible for you to do everything that everybody else does."

He would rally the faculty and say, "Rory's going to be taking this next semester. Let's figure out how to make it happen." They might have to go in between semesters and lower equipment to a table, or they even wound up building some special lab benches that I could work at, or I built a standing chair so I could get on the lathe and the mill. Between them and me, of course, the further I got along, the more I could participate in the process. Anyway, I'd get in there early, and then say, "I don't know. I'm not really stable here. I don't know." We'd kind of work it out. And I'd go.

I was really lucky early on. The first couple of years, a lot of my lab partners were veterans, so we got along real well together. The problem is they had a lot of buildings that still had stairs to get to the labs and things like that. I made a deal with the ROTC commander that I would help with their students, with some tutoring, because I was much better in college than I was in high school. I think I had like a 3.7, 3.8 GPA when I graduated from Cal Poly. I would tutor for them, and they would carry me up the stairs.

WATERS: Nice.

COOPER: Then I could also teach a little bit [about] what it was like to be a non-commissioned officer, and what officers have to do.

WATERS: So you were involved in ROTC in that [way].

COOPER: Yeah, it was an informal way. That was cool. Saul helped me get into the PhD program, too.

WATERS: At what point did grad <**T: 25 min**> school become an option?

COOPER: I didn't even think about it until I got my bachelor's degree, and I started looking for jobs, and what happened was most of the jobs I was really interested in, they were like, "You're a really sharp guy. You ought to go get a graduate degree, and you'll do better." I interviewed with [The Walt] Disney [Company], I interviewed with NASA, I interviewed with PG&E, I interviewed with a couple of defense contractors and NASA suppliers, and most of them said, "You know, we're happy to hire you. We can make this work." Not all of them, but a couple of them. I took the job at PG&E to be closer to home. My wife could keep her job. By that time, she was working at Wells Fargo Bank, and she was going to school at Cuesta College part-time. That's what I thought "I'll get a master's degree at Cal Poly."

But I finished my project at PG&E pretty quickly, and it didn't seem to be a lot of upward mobility. I also got exposed to teaching there. I got to teach some of the apprentices, and I kind of liked teaching. I thought, "Oh." Saul Goldberg and Bill Horton, who was his office mate, they'd say, "Okay, go on for your PhD, and see what you can maybe get a teaching job, or go to NASA, or something like that as a researcher." So I did. I applied to UC [University of California], Santa Barbara.

WATERS: Was the curriculum much different—I'm not familiar with electrical engineering programs—from your bachelor's work to your master's work? Or was it just say more intense?

COOPER: From bachelor's to master's is just more intense, and I got more into digital control and more on the control systems side. My master's thesis was to design an enunciator, which is an alarm system for Diablo Canyon Nuclear Power Plant. It was like a trend analysis system, sensing and trend analysis.

WATERS: Interesting. So the PhD became an option at some point as a master's student?

COOPER: Yep.

WATERS: It just became a natural transition? You decided to . . . . Did Cal Poly have a PhD program?

COOPER: They don't offer a PhD.

WATERS: Okay.

COOPER: Or they didn't at the time.

WATERS: You had to go somewhere else.

COOPER: Yep.

WATERS: Got you. Did you apply far and wide?

COOPER: Nope. I applied to Caltech and UC Santa Barbara. We chose UC Santa Barbara because it was two hours away. My wife could keep her job. By that time, I was working at PG&E. We had bought a trailer, believe it or not, a mobile, we lived in a mobile home. We were trailer trash for three and a half years, single-wide with a popout.

WATERS: And that was accessible, fine? [Or] you guys modified it to?

COOPER: We made it accessible because we could own it. That was kind of nice because that was the first time we had something that was accessible. We had no roommates, or nobody kicking us out because of California's growing housing market. It was in a rent-controlled trailer park because trailer parks in California are under rent control.

WATERS: Huh. Interesting.

COOPER: So we knew what our expenses were roughly going to be.

WATERS: I did want to ask about your wife's transition to living in the States. Was that always—she knew dating you, obviously—a potential outcome?

COOPER: She thought we might go to the United States, and then come back to Germany. She wasn't really looking to stay in the United States. But she did well, because she had studied hotel and restaurant management, and after she graduated, she worked for a Ramada Hotel in Germany for a while. All the systems were exactly the same as in the United States. She got a job at Howard Johnson's within a few weeks of coming to California.

WATERS: What kind of work was she doing?

COOPER: She wound up being the front office manager, because most of the people that work in those hotels, except for the manager, are students or kind of transient jobs, at least at the time. So somebody who actually had trained in that . . .

WATERS: High demand?

COOPER: . . . was in high demand, was unusual. If they were, they would normally go to the big cities, right, not San Luis Obispo.

WATERS: True.

COOPER: And even in **<T: 30 min>** San Luis Obispo, not Howard Johnson's. It just so happened that Howard Johnson's had the job open, and the manager there, Ed Wilcox, he was

really nice and got along. The two of them really did a great job running that Howard Johnson's. It's a hotel and restaurant there. Then she started going to school part-time at the community college, and eventually, she left there to get a job at Wells Fargo Bank, was a business teller, sold business products to businesses, small businesses, or banking products to small businesses. She liked that because at Howard Johnson's, even though her boss was great, the pay wasn't that great. You got a better salary and benefits at the bank. But also, hotels, you don't actually meet anybody from the city. Everybody's from somewhere else, just transient.

She thought the job at the bank, she'd get to meet the locals, and, you know, get more connected to the community. She did. She met my former girlfriends, met their parents, and the people at the high school where I went. It was a little dangerous for a while there. [laughter] At Howard Johnson's, she was isolated, and when she went to work for the bank, she got to know my entire life history from other people's perspective. Because there weren't many banks in the city, so it was a good chance that she . . . it was like, "Cooper, hi. You have an accent. How did you wind up in San Luis Obispo?" Then she'd tell [them]. "Oh, I know Rory." So she'd come home at night with these "You didn't tell me about this." [And I'd say] "You know, that's not really fair. I should get a job at a bank in your hometown and hear what they have to say." [laughter]

WATERS: When you were applying for PhD programs, both at . . . you did UC Santa Barbara . . . ?

COOPER: Yes.

WATERS: And what was the other one?

COOPER: Caltech [California Institute of Technology].

WATERS: Got you. Did your disability come up at all in the application process?

COOPER: Yes.

WATERS: How did [you manage that]?

COOPER: Not in the application, so Santa Barbara. The nice thing [was that] I mentioned Bill Horton. He was doing a sabbatical at UC Santa Barbara, and he called me up, and he said, "Rory, you're going to get rejected because they think your grades are inflated out of sympathy

for your disability and being a veteran. They're not going to let you in the PhD program. So you need to call down here immediately and ask for an appointment with the department chair and the admissions committee before they send you the rejection letter."

I called down and I said, "I'll be in your area. I'd like to come by, if I can, and meet with you and some of the faculty, and really interested in coming there for my PhD." [Then] Bill had kind of said [to them that] "Oh, you should really meet this guy. He's different than you're thinking. He's very athletic. He's very independent." They agreed.

I went down there. I met with them. I spent the day. They said, "Oh, well, this is very good. We're glad we're meeting you." Then a couple of days later, they called me up and said, you know, "You're going to be admitted. Your letter will be on its way." They gave me a teaching fellowship as well.

WATERS: I did want to ask, was your master's program funded at all?

COOPER: No, because I was working, right? I did it part-time in the evenings.

WATERS: And your PhD was . . . you did that full time?

COOPER: Yes. [. . .]

WATERS: And you received funding for that?

COOPER: Kind of. I had a teaching fellowship for the first couple of years, and then the last year, I got a grant to self-fund part of my work. The last year is kind of funny. I didn't take the teaching fellowship, because I was preparing for the Paralympics in 1988 in Seoul, [Korea], and so they said, "You have to choose between the teaching fellowship and continuing your PhD or going to the Paralympics." I said, "I'll finish the PhD, do the Paralympics, and I guess I won't be able to get the teaching fellowship, right?" They said, "Well, they won't kick you out of the program." but they wouldn't offer me the teaching fellowship if I was going to be training for the Paralympics.

My department chair was . . . . He would ask me periodically, "So when are you going to quit the Paralympics and finish your PhD?" I said, "I'm going to do them both. I'll do the Paralympics in '88 and <**T: 35 min**> I'll finish my PhD in '89." And I did. I went to the Paralympics in '88 and finished my PhD in '89.

WATERS: I did want to ask, immediately upon coming home from Germany, did you become involved in any advocacy groups or any disability groups?

COOPER: I did. I got started in wheelchair basketball. Tim Davis, my peer mentor and I, we started a wheelchair basketball team called the Slow Motion Riders. That Howard Johnson's where my wife worked, they happened to be hosting a meeting of the California Association of Physically Handicapped, and the president was a lady named Judy [Judith E.] Heumann, who actually went on to later become an Undersecretary for Education, and worked for the World Bank, and now under the [President Barrack H.] Obama administration actually be a special assistant to Secretary [John F.] Kerry in the State Department. My wife said, "Yeah, my husband's in a wheelchair."

They were like, "Well, tell him to come on down. I met Judy, and Ed [Edward V.] Roberts, who—all of these were people who helped pass the ADA—are icons in the disability rights movement. I can actually show you a poster created for the ADA that has their pictures in it. Yeah, they got me involved in advocacy, and getting curb cuts, and getting the university to be accessible, and about employment. I was kind of an anomaly for them, right? Because having a student in a wheelchair studying engineering was also a little unusual, even for the disability rights movement.

WATERS: Why was it uncommon for people with disabilities to be in the engineering program?

COOPER: Because a lot of the engineering programs were physically not accessible. Secondly, you had to use lathes and mills and things like that, which are largely inaccessible today. It's still a very hard field to break into for people with severe physical disabilities. Then your guidance counselors would sort of push you towards law, social work, counseling, political science, teaching.

WATERS: Later on in your career, I'm sure you mentored other people coming through the ranks. Do you push them towards . . . . How do you discuss that with them?

COOPER: I push them to where they want to go, but I'm a big STEM [Science, Technology, Engineering, and Mathematics] advocate. I tell them there's lots of jobs in STEM, and there's plenty of room in STEM for people with disabilities.

WATERS: Of course, we need to talk about the Paralympics. How did you become involved with that?

COOPER: Because I was a runner, right?

WATERS: Right.

COOPER: I just transferred to being a wheelchair racer, and I was pretty fast. So just, hey, won more races, and go to the national championships, and you win some races, and they ask you to be on the national team, and you go to the training camps, and you set some national records and world records, and you just keep moving, right?

WATERS: Right.

COOPER: My wife was very supportive. We spent a lot of our time together on the track, with her yelling out times.

WATERS: So there are varying levels of spinal injuries, obviously.

COOPER: Yeah.

WATERS: The manipulation of the wheelchair depends on the injury, often.

COOPER: Yep. You run in different classes.

WATERS: Okay. Got you. And the [guy in] picture, what was his name?

COOPER: Tim Davis.

WATERS: Tim Davis. He was already involved in the Paralympics?

COOPER: He never made it to the Paralympics.

WATERS: Oh, really?

COOPER: [Yes]. He was involved in wheelchair sports.

WATERS: He was a local guy there in California?

COOPER: Yeah.

WATERS: Did you know him before your injury?

COOPER: Nope.

WATERS: And so what is the process of find . . . you have to go through tryouts?

COOPER: It's actually just like the Olympics.

WATERS: Do you get invited, or do you have to just win a certain . . . . How does that work?

COOPER: You have to quality for the trials, so basically, you have to go to a regional qualifier that gets you to the nationals. The nationals, you can quality for . . . you have to beat the international qualifying mark, and then you get invited to be on the development team. If you're on the development team, you get a chance to travel a little bit internationally. If you do really well there, and you meet the qualifying standards, and you keep beating, then when the Paralympics come you get to go to the trials. You finish in the top of the trials, you get to go.

WATERS: And so you went to Korea?

COOPER: I went to Korea. Yeah.

WATERS: What was that experience like?

COOPER: Awesome.

WATERS: Yeah?

COOPER: I've got some pictures in my office. I mean, where do you get to race in a wheelchair, especially 1988, in front of seventy thousand screaming fans, It's a pretty amazing experience. Stay in the Olympic Village. It's no different than the Olympics, and it's no easier to get there, either. It's just as hard to get to the Paralympics as the Olympics. It's kind of the same experience. I was lucky. Seoul was kind of the first one where the Olympics/Paralympics were held in the same venues, and same place, same venue. So **<T: 40 min>** I still participate in the Paralympics, but as a coach for a while, now as a sports scientist. So we got to go to Brazil. I just got my invite to go to Korea.

MARTUCCI: What do you do as a sports scientist?

COOPER: I'm one of the few engineers, and technology plays a huge role in the Paralympics, and we want to see how people are bending the rules. How is technology evolving to [and] going to affect the Paralympics? Are there disparities based on countries? Are there technological advantages? Is it an individual technological advantage based on sponsors? Or is it a country's advantaged—based on the wealth of the country—or its policies? Those are the things that that's what I get to do.

MARTUCCI: Do you have to be like . . . do you get called in to resolve disputes or questions about somebody's wheelchair, or if they're doing . . . ?

COOPER: That's more for the officials to handle. I usually work on educating the officials, rather than getting involved in the individual disputes. In policy for the next Paralympics, for example, right? Like saying, "Hey, we saw this, this, and this. We need to. . . . Is that within the rules, not within the rules? Do we need to clarify the rules? Do we need to do further research on this?"

WATERS: I don't know much of anything about wheelchair racing. Are all the wheelchairs standardized?

COOPER: No.

WATERS: It's completely . . . or there're parameters that you have to meet?

COOPER: There're parameters you have to meet. Yeah, it's more like NASCAR [National Association for Stock Car Auto Racing]. More like Formula 1 racing, actually.

WATERS: Okay. And each athlete has his own specifications.

COOPER: Yep. They have to, right? It's got to fit your body like a glove.

MARTUCCI: Are the Paralympics . . . do they break it down by gender, like they do in the Olympics?

COOPER: Yeah.

MARTUCCI: So you have the female and male?

COOPER: Yeah, except for a few sports, like boccia and quad rugby, men and women compete together. But most of them are broken down by gender, and then they're broken down by physical ability.

WATERS: So that was 1988.

COOPER: [Yes].

WATERS: And then simultaneously, you're doing a PhD in electrical engineering.

COOPER: Yep.

WATERS: How did you balance those?

COOPER: Work hard.

WATERS: Yeah?

COOPER: Have an understanding wife. Burn up a car. I was lucky because my PhD advisor was Steven Horvath. He was an engineer and physiologist. And so I was able to—my dissertation was on optimizing wheelchair racing performance—blend the two, expanding optimization theory on the engineering side and applying it to wheelchair racing, to kind of tie in my sports side.

WATERS: And your resume does say you have a concentration in bioengineering.

COOPER: Yep.

MARTUCCI: What is optimization theory?

COOPER: "What's the most efficient or least efficient way to do something?" is a way to think about optimization theory.

WATERS: And how much work had been done in this field, as far as specifically to the wheelchair and the technology behind it in the late eighties?

COOPER: Almost none.

WATERS: Okay, so there wasn't a large foundation of stuff you could rely on to.

COOPER: No, it was just starting in the 1980s. I kind of got in on the ground floor. From a research, engineering, and science perspective.

WATERS: While you were doing your PhD, were you looking forward to teaching? What was your goal, once you were done with your work?

COOPER: That's really a good question. I wanted to, yeah, I was looking for. I wanted a faculty position where I could do teaching and research.

WATERS: And so you graduate in ’89?

COOPER: Yep.

WATERS: And then did you start applying for jobs?

COOPER: I did.

WATERS: And how did that go?

COOPER: It actually went pretty well. I applied for some jobs at several universities, and I got interviews and offers at three, four. Four.

WATERS: For faculty positions?

COOPER: For faculty positions. One was the University of Illinois, Urbana-Champaign, and my wife basically said, “I won’t shovel snow outside of Germany,” I kind of had to eliminate them. Three were in California. Two were tenure streams, one was a non-tenure stream. Stanford [University] was a non-tenure stream position, primarily research, with their VA Rehab R&D [research and development] center. I turned that down because of the non-tenure stream. I’m not—now **<T: 45 min>** retrospect, I probably could have taken it. Now I realize that big universities like Pitt and Stanford and stuff often hire people outside the tenure stream, kind of get a look at you, see how you’re going to do, and then you can compete for a tenure-stream position. But I didn’t know that at the time.

The other one was San Francisco State University and California State University, Sacramento. San Francisco State really wanted me. I would have loved going there, except the cost of living in Sacramento, [California], in San Francisco, [California], is crazy, even back then. I’d have had to find a home for our trailer or something, if we were going to live in San Francisco. Then Sacramento was exciting, because the UC [University of California] Davis Medical School campus is very close to the Sac [Sacramento] State campus, and they offered me the opportunity to work in bioengineering—first, they didn’t have biomedical engineering at Sac State—it would have been mechanical engineering at San Francisco State. I had biomedical engineering at Sac State. Then the other thing was the [University of California,] Davis Medical School offered me to collaborate with them in PMNR [Physical Medicine and Rehabilitation]. So, I took that job.

WATERS: Okay. Did your disability have any role in applying for these jobs? They were all aware [of your disability]?

COOPER: Oh, yeah, they were all aware, and they were all supportive, actually.

WATERS: You didn't feel that it had any effect one way or the other?

COOPER: Not for the ones that interviewed me or offered me jobs. They were all very cool with it. That was even pre-ADA. They just said, "You got here for the interview. You know your stuff. You've published papers. You've got your PhD at Santa Barbara." They knew about my athletics. I think they were all cool with it. I mean, there was a little bit when I got to Sacramento with some of the individual faculty in other departments; one friend of mine told me when I went up for promotion, they said that he had to argue with a faculty member who said, "He's just a white guy in a wheelchair. I don't know what's so special about him." [laughter] He goes, "Hey how many people are in a wheelchair on faculty here? One? Maybe that makes him special, right? Or how about the fact that he has grants and publications and good student evaluations? That might make him special, too, right?"

WATERS: Well, I think that . . . .

COOPER: But most of the time I was accepted pretty quickly with my faculty.

MARTUCCI: Did you have to ask for any kind of accommodations when you got to Sacramento?

COOPER: I did. I had to ask for a few. The good thing about California is their accessibility laws are way in advance of the rest of the country. They already had accessible bathrooms, and entrances, and elevators. We had to do some work on the lab equipment, and I got really close to the shop staff, to make some of the modifications for me. Between Santa Barbara and San Luis Obispo, I'd kind of figured that out.

The funny thing was, is, though, that when the ADA was passed, the chancellor of the Cal State University system asked me to chair the committee to help make the system accommodate faculty and staff with disabilities. The big accommodation for me was I was . . . . So he gave me a budget to and a committee, and we kind of said, "What do you . . . ."

People would apply and say, "I'm a faculty member here, and I'm blind, and I need this and this and this." We kind of order it for them, and get set up, and get the training. It was

smart, because he centralized it across the entire twenty some campuses, because, you know, if it got done in San Diego, we got a similar request from San Luis Obispo, we already had the answer, rather than each person exploring it. Plus, you could use the system's purchasing clout to buy more than one, because what we wanted to buy a lot of were laptops and LCD [liquid-crystal display] projection units.

MARTUCCI: Why?

COOPER: Because I couldn't write on the chalkboard, but I could do it all on a laptop, on Word or PowerPoint, and then show the LCD projection unit. That was also pretty awesome, because the people with disabilities said had these laptops—they were big laptops and these projection units—before the general faculty had them. Matter of fact, the original LCD projection units went on the overhead projectors. You sat it on the overhead projector, and it projected through it. Then a lot of the students were like, "Whoa, that's really cool." Because I would have images, **<T: 50 min>** where other faculty they'd bring in their yellow dog-eared notes from decades before, "Rah rah rah," on the chalkboard. [laughter] "This Cooper, man, he's got this state-of-the-art stuff." It ended, of course, other faculty going, "Well, why can't we get that?" Then the university was smart, and just said, "Well, yeah, we ought to be installing these in every classroom."

MARTUCCI: In the lab, was it . . . you talked about like making benches that were lower.

COOPER: Yeah.

MARTUCCI: Were there any other sort of standard modifications?

COOPER: Not so much for me, right? I mean, other people needed other modifications, and eventually, we worked on things like oscilloscopes, talking calipers, and equipment that [has] bigger knobs and stuff for people who lack hand dexterity. But fortunately, I didn't need that many modifications, and so it was kind of easier to be the trailblazer in some ways, right?

WATERS: That might be a good stopping point for today. Do you have any other questions?

MARTUCCI: No.

WATERS: Do you want to add anything that we didn't cover up to this point in your career?

COOPER: No, that's good.

WATERS: Sounds good.

[END OF AUDIO, FILE 1.2]

[END OF INTERVIEW]

INTERVIEWEE: **Rory Cooper**

INTERVIEWERS: **Greg Waters**
Jessica Martucci

LOCATION: **Human Engineering Research Laboratory**
Pittsburgh, Pennsylvania

DATE: **23 June 2017**

WATERS: Today is June 23. This is Greg Waters. I'm here with Jessica Martucci. This is part two of our interview with Dr. Rory Cooper. Good morning.

COOPER: Good morning.

WATERS: I did want to go back. We finished yesterday at the end of your PhD program. I did want to go back and ask a couple of follow-up questions about your work. On your resume, it says that right after injury in 1981, you began working with the Equalizer Wheelchair Company.

COOPER: Yeah.

WATERS: Can you talk about how you got connected with them, and what kind of work you were doing?

COOPER: I got connected with them in a very odd way. This guy Craig Bash, who was working with Equalizer, was a wheelchair user. I think he was kind of the original brainchild of the chair. I happened to just meet him at the farmers' market in San Luis Obispo on the street, and he noticed that I had built my own chair, and he was using a chair that he'd built. We just started talking about . . . and then that I was going to Cal Poly and studying engineering. He said he was working for Equalizer with Craig Vetter, that makes like Vetter fairings and motorcycle helmets and that. That Craig had a house in San Luis Obispo, and they had a small shop where they were designing, they were creating this new wheelchair. And they asked me to come up, and sort of it worked out—while I was a student there—as a consultant on various aspects of the design. Then they also . . . I was involved in wheelchair racing, and they got connected to Jim Knaub, who was one of the top wheelchair racers in the world at the time. They wanted to make a racing chair for Jim. I got engaged in that project, too.

WATERS: And then shortly thereafter, in ‘82, Cooper Engineering Company.

COOPER: Yeah.

WATERS: Was that a preexisting company, or is that when you started?

COOPER: That was a spinoff of my parents’ automotive machine shop. I started making—I gave it a try—to design and sell my own sports wheelchairs, like racing chair, hand cycle, and rollers. Actually, Jim Knaub wound up using my rollers, and Bobby Hall, who was a wheelchair manufacturer, bought some of my rollers and distributed some of the rollers. Eventually, Quickie Wheelchairs bought me out. They never really brought any of their projects to market that I was making, but they adopted them into their designs.

WATERS: Were you familiar at all with wheelchair design prior to your injury?

COOPER: No. No.

WATERS: Not at all?

COOPER: Not at all.

WATERS: Immediately upon being in a wheelchair yourself, did you just see all kinds of problems with the current designs?

COOPER: I did. Yeah.

WATERS: What were some of those?

COOPER: Well, they were like eighty pounds, and steel, and, you know, there were three different sizes, like sixteen, eighteen, and twenty inches. It didn’t take a lot of knowledge to be able to give people a wheelchair, and they all kind of [have] these Naugahyde seats, and frankly, they were just bad. Fortunately, there were some people like Bobby Hall, Jim Martinson, and Marilyn Hamilton in the United States, and Rainer Kuschall and Errol Marklein in Europe that were starting to build their own chairs, and starting to sell them. I got started because I got out

of the hospital, and I had this eighty-pound Invacare Rolls wheelchair, and I knew I wanted to go to college. I started trying to push a mile a day, and after about six weeks, it just basically started falling apart.

My Army unit ran organized a fun run, and they raised the money to buy me a Quadra wheelchair, which was . . . two wheelchair users, Jeff Minnebraker and Brad Parks, had created that small company. It was a pretty cool chair, except they made a lot of parts by hand, and their quality control wasn't that great. It was a good concept, but it wasn't . . . . Marilyn Hamilton came along with Jim Okamoto and Dave Counts, and they started using computer numerically controlled machining— **<T: 05 min>** higher quality, higher tolerances and things—to really move things along. I started out making chairs basically for myself, sort of consulting with Craig Vetter and Craig Bash, but also wanted to build a better racing chair, building the hand cycles because triathlons were just catching on. I wanted to do a triathlon. That was where I started working on that. Rollers were a way to—that's a stationary trainer—train on your racing chair without . . . if it's a rainy day or too cold outside.

WATERS: Like a treadmill, basically.

COOPER: Yeah.

WATERS: Okay. Could you talk about wheelchair racing? Immediately upon being injured, you jumped into wheelchair racing?

COOPER: I did. Yeah, I loved it. I was bad at first. I'd start in the back of the pack, and my wife, [who] was a dancer and gymnast, would jog along with me. I got in better shape, and we started building better chairs, and eventually started finishing in the middle of the pack. Then finishing towards the front, and eventually it got to the point where I would win some races. But my wife still kids me to this day that I'm a better engineer than I am an athlete. I was able to stay one step ahead of the competition a little bit by technological advances.

It was kind of fun in the entire 1980s because the chairs were changing so fast that I'd come up with an innovation, or somebody else would come up with an innovation. You'd have like a one-month advantage, go to a couple of races, and then somebody would build upon that.

WATERS: I was going to say, it seems like it would be a collaborative effort to make the wheelchair better, but if you're racing, there's a competition involved, so you want to keep it secret, or do you want to . . . ?

COOPER: Well, the problem is you can't really keep it secret, right?

WATERS: Right.

COOPER: I mean, once you come to show up to the race, then they see it.

WATERS: Yeah. So, there wasn't much sharing going on though?

COOPER: There was sharing. We weren't really patenting things, and people were sharing. You realized it didn't take you long to figure out that after a couple of races. Actually, there was competition, and people try to get faster. But there was a lot of sharing, too, because we were trying to make the sport itself better and make everybody faster. First, it was, can we get as fast as the runners? Then after that, it was just how fast can we go? And stay with. We worked to push to change the rules. I was pretty engaged in that process.

WATERS: How so?

COOPER: Originally, racing chairs had to be four wheels, and so I did some. I skirted around the rules on that a little bit, by hanging like a tiny toy car wheel off the side. Then they said all four wheels have to contact the ground, so of course, you had the little tiny wheel on a piece of piano wire touching the ground. [laughter] I think they eventually gave up and let us [the three-wheelers]. Then the wheelbase was limited. It could only be twenty centimeters long. From tip to toe, that's pretty short. We argued that caused a lot of accidents and things, and so the wheelbase got extended. That really made the three-wheelers practical and allowed people to change their body position, so you could lean more forward and get more power into the push rims, and that changed the sport dramatically. We clipped the push rims onto the spokes. A lot of people thought that you couldn't do that, they'd break. That was actually something we did with Equalizer, [we] were the first ones to do that. We played early on with ergonomic shapes of push rims, which was the optimal shape, rather than just a round tube.

The steering gear was another one, and that was illegal for a while. The steering gear had to be . . . the wheels had to freely castor. But we showed that the steering gear made not only the sport faster, but safer, and less risk of injuring the wrists and shoulders as well from repetitive strain injuries from pushing with the right arms harder, because of the turns on the track. Or compensating for the road crown on the road. But, you know, that's what sports supposed to be like. It evolves.

WATERS: Right.

COOPER: I use the example of pole vaulting. People used to pole vault with a bamboo pole. Then they pole vaulted with an aluminum pole, fiberglass poles, and covered fiber poles. And bamboo poles, you could only go so high because they didn't flex, so it couldn't go higher than the pole. You couldn't put too much force in it, or the pole would shatter. Aluminum poles stopped the poles from **<T: 10 min>** shattering, but they didn't flex, either so you had to . . . basically, couldn't go higher than the pole. The fiberglass poles came in, and the poles not only could be stronger, but they could flex. The carbon fiber poles were even stronger to flex even more and give you a better energy return. People went even higher. They changed the sport over all those times.

MARTUCCI: Were the people participating in the wheelchair racing sport primarily veterans?

COOPER: There were a lot of veterans early on. A lot of Vietnam. World War II veterans really started wheelchair . . . actually, that's not true. World War I veterans started wheelchair sports. They started playing softball and volleyball, and the chairs were pretty bad, but they wanted to be active, and it was kind of the first concept of using activity, both work-related activities and sports and recreation-related activities, as part of rehab.

Then in World War II, it really kind of ballooned. That's the Paralympic movement, [that] is basically a spinoff of World War II. It's hard to say who is . . . . Wheelchair basketball also started in World War II, so the United States, Paralyzed Veterans of America [PVA] started wheelchair basketball. Every major war, Vietnam was a big . . . snow skiing really kind of started. There was sort of sled skiing and pole skiing before that. But the mono-ski is an evolution from the Vietnam era veterans. Wheelchair racing had started after World War II, but the demand for better chairs. [. . .] The Everest, Jennings chairs, and the Invacare chairs of the day towards the modern chairs that we see today, that's a result of mostly Vietnam-era veterans. Marilyn is not a veteran. Neither is Bobby Hall. Jim Martinson is a Vietnam veteran. It was a little bit of both.

MARTUCCI: Can I ask another follow-up? You were making a lot of innovations in the 1980s, and you said that that sort of like . . . it appeared that a lot of other people were starting to make innovations as well with wheelchair design. What do you think it was about that decade, other than just having Vietnam veterans around, maybe?

COOPER: There are a couple of things. The Rehab Act of 1973 basically became enacted in 1977, and that started to make high schools and colleges more mainstreaming. There was sort of of two parallel movements. There was a disability rights movement that started in the 1960s with the Centers for Independent Living, and getting people out of institutions. At the same time, there was a kind of the sports movement as well, and there were people who wanted to be

able to participate in mainstream sports, do road races, track, swimming, and things like that. They kind of went in parallel.

The other thing that happened is that people, because of those two movements, people with disabilities themselves wanted to start running sports organizations. They started challenging the technology, challenging the rules, challenging the venues. Some of those early wheelchair track meets, for example, were held around cones on parking lots, rather than on real tracks. I think the other thing is it started to . . . the colleges and universities had to make plans in order to incorporate people with disabilities on campus. That changed things, too. People started to get an education. They started learning about . . . some people would go into adaptive sports and recreation, and they started coming up with ideas. Only a handful of us went into engineering, but at least some of us did, and we started looking at it from that perspective.

Then there was a runners' movement, so that kind of drove things. There was the International Year of People with Disabilities in 1981, from the UN [United Nations]. That brought attention. The VA created the National Veterans Wheelchair Games in 1981, created by Tom Brown and some others. Tom Brown himself was a wheelchair athlete, which are track, field events, and basketball.

<T: 15 min> I think it was kind of people started to come on their own, "Hey we can do these things ourselves. We can take care of them ourselves." That caused innovation, created innovation. I was very proud that I was part of that myself, Marilyn Hamilton, Bobby Hall, Jim Martinson, Jeff Minnebraker, Brad Parks, and others. The fun thing was we all know each other. Because we competed in sports against each other, and we shared designs, and . . . I met and got to know Ralf Hotchkiss. We first met at a track meet in San Jose, we became friends and worked on and off on projects for many years afterwards. He is a real pioneer in creating wheelchairs for low-income countries.

MARTUCCI: Do you think there was any, I mean, was there anything . . .

COOPER: Peter Axelson was another one.

MARTUCCI: . . . technology-wise? Sorry, say that again?

COOPER: Peter Axelson was another person, and he's also a veteran. He was more on the winter sports side, like cross-country skiing and downhill skiing.

MARTUCCI: You had mentioned that when people started to build their own chairs, there were some quality control issues, but that once more computerized creation of the parts came along, that that might have helped. Was there a role that technology was playing in this period

of innovation? Like new technologies that were becoming available, that were allowing people to build better chairs.

COOPER: Yeah. Well, aluminum came down in price, and some of the Kevlar and stuff like that, just like the home build aircraft people started making that available. I used to buy a lot of chromoly, carbon fiber, and Kevlar from Aircraft Spruce & Specialty Company, which I learned about because a friend of mine's father was building a home-built aircraft, an ultra-light aircraft, and so he gave me the catalogue. I thought, "Look, there's all this cool stuff you can get for. I could use for wheelchair building in here." That helped. There were improvements in bicycle technology at the same time, [I] and started to adopt that and to make better wheelchairs. Wheelchairs still used [something] like open bearings, back at that time. The bicycle industry was starting to go with the sealed bearings. I used to . . . actually, that was also the beauty of my parents having an automotive machine shop. The first bearings that I would use were like off of alternators or generators on cars, when they went to like sealed bearings, to last longer. I used to get the quick release pins on the chairs for the axles. They came from helicopters. I used to basically comb the surplus stores, the military surplus stores, and when they would show up, basically buy all the pins I could.

WATERS: Was there any jealousy in the wheelchair racing community when you show up and you have a background in engineering, and you were an athlete previously?

COOPER: No. No. I didn't feel—no. Well, there were other people a lot of people were athletes before. I mean, Jim Knaub was an Olympic pole vaulter. You know, it wasn't us against each other so much. It was really us against the rest of the world. So most of those people are—they're friends now—they were friends then, they're still friends of mine now. A lot of them are retired, but some are still innovators in other domains, some in other businesses. Marilyn is still . . . now she's like helping design therapeutic equipment. I mean, a lot of them I think liked the fact that I was an engineer.

I would come up with something, design it, and then they'd copy it. Then other people came up with ideas, too, and I would copy their ideas, incorporate them, and like I said, we were really trying to move the sport ahead, right?

WATERS: Right. You did mention wheelchair triathlons. Could you talk about that? How does a wheelchair triathlon work? Same as [a triathlon]?

COOPER: It's just a regular triathlon. You get in the pool and swim.

WATERS: Right.

COOPER: Or the lake or river or whatever. And then have to use a hand cycle for the bicycle part. It's now a Paralympic sport, which is pretty cool. I was the first one to do an Olympic level, Olympic distance triathlon. Then you do use a racing chair for the, quote, running part.

WATERS: I know in the world of running they have extreme triathlons and like extreme endurance races. **<T: 20 min>** Is that happening in wheelchair racing?

COOPER: There's a few. Yeah. I mean, some people have done the Iron Man. Carlos Moleda is one of them. Carlos, he was a Navy SEAL, injured in Panama. When I first met Carlos, [I] kind of helped train him into wheelchair sports, and he's done the Iron Man a few times. He's a great athlete. There are people that have done the Race Across America, and either—it's actually been done in the eighties and nineties—in their racing chair, and now in the hand cycles. Rick Hansen, a Canadian, was an ambassador but he's a very prominent Canadian celebrity. Actually, a bit of trivia, he was the Canadian athlete of the year, a title he shared that same year with Wayne [D.] Gretzky. Rick pushed his racing chair around the world, first person to do that. That was also in the late 1980s.

WATERS: Interesting. Getting back to your career, in '89, you began work at Cal State Sacramento.

COOPER: Correct.

WATERS: You were hired as an assistant professor in the department of . . . let's see, electrical and electronic engineering and biomedical engineering.

COOPER: Correct.

WATERS: At the same time, you were an assistant professor in the Assistive Device Center.

COOPER: Yep.

WATERS: You were hired to do both at the same time?

COOPER: Yeah.

WATERS: What was the Assistive Device Center? Was that already existing when you [were hired]?

COOPER: That was already existing. That was created [by] a professor named Al Cook.

WATERS: What kind of work were they doing?

COOPER: They provided assistive technology to people with disabilities. It was a clinic.

WATERS: Okay. So, it wasn't a lab. Was it creating new technologies?

COOPER: Yeah, well, at that time, you had no choice. So, all the clinics at that time made technologies as well as delivered them, [. . .] that's actually how the field of rehabilitation engineering started. It really started in the sixties, sort of started getting formalized in the 1980s. But yeah, you had . . . to this day actually, we still fabricate things for certain clients. There are always some orphan products or somebody who's got an unmet need with existing commercial products. But at that time, that was pretty common. We'd literally be making cushions and back rests and inserts and specialty seating systems and alternative switch controls, and writing custom software.

WATERS: Was your role when you began at Cal State Sacramento, was that teaching or was that research? Or was it both?

COOPER: Everybody at Cal State Sacramento teaches. It's primarily a teaching school. But I did research there as well.

WATERS: As well?

COOPER: [Yes].

WATERS: What were you teaching?

COOPER: I taught rehabilitation engineering. I taught some robotics. I taught some control systems. I taught some medical instrumentation.

WATERS: And then in 1990, they opened up the Human Engineering Laboratory.

COOPER: Yep, I created that. Yeah.

WATERS: You created that? Okay.

COOPER: Yeah. I had started expanding my research, and so I asked the department chair and the dean for some space, and to create the Human Engineering Laboratory. I started to attract more students there.

WATERS: That's kind of an offshoot of your work in the Assistive Device Center? Was it . . . ?

COOPER: This was . . .

WATERS: . . . related to it?

COOPER: . . . to be more focused on research. The ATC didn't really do research, per se. It did do new devices for individuals, and would publish case studies, but its focus was on clinical service delivery.

WATERS: And then in 1992, you got tenure?

COOPER: Yeah.

WATERS: Cal State? And then in 1994, you became a visiting professor first here at Pitt.

COOPER: I did. Yeah. I gave up a tenure-stream position to come to Pitt to be a visiting professor.

WATERS: Could you talk about that? Was that a hard decision to make?

COOPER: It was. I wanted to take my chances to be at a major research university. They were starting this new department of rehab science and technology, plus a bioengineering department at Pitt. It just seemed . . . my postdoc advisor, Charlie Robinson, had been appointed the first chair here. He talked to me about coming out, what the opportunity would be. It took me about a year to decide back and forth. But I decided to **<T: 25 min>** make that jump. Like we talked about earlier, I'd kind of learned the lesson that a lot of major universities hire people outside the tenure stream, and if you do well, you'll get a chance to move in the tenure stream. I took my chances.

WATERS: And you came to Pitt to found this lab?

COOPER: Yep. To found HERL [Human Engineering Research Laboratories]. Yep.

WATERS: Got you. So they said come and make a lab?

COOPER: [Yes]. Work with the VA.

WATERS: That's an interesting partnership. So how did the VA become involved?

COOPER: The VA became involved from the very beginning. I did my postdoc in the VA at Hines VA in Chicago, [Illinois], with Charlie and John Trimble, and they had a rehabilitation research and development center—which HERL now is—from the VA. I had VA funding from Sacramento. The VA here in Pittsburgh did not have a lot of rehab research, and had, besides Charlie, no rehab engineering research. They wanted to. It makes sense. The VA has a long history of strong rehab engineering research, dating back to World War II. In order for the university to build its research, to partner with the VA made sense. We originally partnered with the Highland Drive VA, which no longer exists, but it was a neuropsychiatric VA and rehab center. So it was kind of a nice place to get started.

WATERS: So did they give you free rein when you came here and said, "You have the vision, you set up the lab how you want it?"

COOPER: I don't know about free rein.

WATERS: Right.

COOPER: They gave me twenty-five thousand dollars and a bathroom and a locker room to start my lab in. The original HERL was in our—my wife stayed in California to finish her degree for the first six months—basement and dining room. Once the VA found a bathroom and a locker room to give us a space, we moved into the bathroom and the locker room. My original office was literally the towel cage. [laughter] So rather austere start. I mean, I guess if you could call that free rein.

WATERS: Did they give you a promise of funding for a certain amount of time?

COOPER: Nope.

WATERS: No?

COOPER: Twenty-five thousand dollars, a bathroom, and a locker room.

WATERS: And that was it?

COOPER: That was it. Sink or swim.

WATERS: So how did that go? Obviously, it worked out.

COOPER: I could swim. I was able to bring a couple of grants with me from California, and we were able to get some success pretty quickly on with getting grants.

WATERS: I was going to ask about funding. How this lab works, and how the history of the funding has changed over time, if it has.

COOPER: It's changed tremendously. Early on, we were lucky. I found Mike [Michael L.] Boninger, who was coming here as a postdoc, and we were able to get him supported on a

NIDRR [National Institute on Disability and Rehabilitation Research] postdoctoral fellowship grant, and he became the medical director, and then he was able to get an NIH [National Institutes of Health] KO8 award, early faculty development award. That really helped a lot. Between him and I, we wrote grants, and for a while, we were very successful, and we kept getting them. That's what we lived off of, basically. He had to provide some clinical services. He was an MD. I had to do some teaching and get my grants.

The big change for us was in 1999. We were able to land a VA Rehabilitation Research and Develop Center, and a NIDRR spinal cord injury model systems grant. That's what really changed things. The other thing that really helped us out is Paralyzed Veterans of America has always helped me. In Sacramento, they would help out with small amounts of funding, and then moved from Sacramento to Pittsburgh, they also continued to contribute to funding. They do to this day. That helped. That helped us quite a bit. Eventually they coordinated with some other foundations, like the FISA Foundation, which is not Pfizer [Inc.], the drug company, but FISA, F-I-S-A.

Then we got engaged in wheelchair testing in the 1980s from Sacramento, and I had personally paid for some of that equipment, so I brought it with me. That got us early on in wheelchair testing, exposed us to some of the companies, and they sponsored some of our development work and some of our students as well. And got engaged with Dean [L.] Kamen **<T: 30 min>** and Johnson & Johnson on the Segway and the iBot. That helped us, too, sort of build up some corporate-sponsored research and development. That allowed us to get more space, hire more people, build a bigger team, go after more grants, bigger grants, and kind of led us to where we are now. How we're still funded today is fortunately we have a couple of endowments, so some people like PVA and FISA Foundation and others have been generous enough to help contribute towards endowments. We have some donors that help support some of our programs. We worked with the university to set up an individual donor campaign to support HERL and some of its individual programs.

We still rely heavily on grants and contracts. We're pretty much a soft-money organization. I'd love to find an endowment, a naming sponsor or something like that, that I think could give us some long-term security. It's a tough life, living in three and five year segments, which is the length of typical grants. At least having a little bit, some small endowments and some gifts help smooth out the peaks and the valleys to start some new ideas, or fund some seed projects, and to help people when they're struggling a little bit to bridge them between grants. We've grown to basically a bathroom and a locker room to about thirty thousand square feet, and about seventy to a hundred. In the summer, we balloon up to about a hundred, when we bring in the student interns.

In the core, we've stayed the same. Our mission/vision it's been tweaked a little bit, but basically what it was. We've always engaged students. It's always been about teaching students and research, undergraduates, graduate students, and postdocs in research, creating and evaluating new technologies to change the lives for people with disabilities for the better, with a strong focus on the veterans' population.

WATERS: When you first started the lab, you were very—Sacramento and your own personal experience—involved in wheelchair technology. Was that the focus in the beginning, starting the lab?

COOPER: Yeah. The beginning was manual wheelchair technology. There was still a tremendous need for advancement. We've kind of moved . . . we still do a little bit of that, especially in the fitting and the ergonomics and transfers. But we've disseminated a lot of that information. I think the clinicians and consumers understand it fairly well. We could do a little bit better on the uptake of the knowledge. All of the health care kind of has that problem.

But we've driven . . . the need has moved more towards power chairs, robotics. You know, smartphones are ten years old now, so they offered an entirely different opportunity for cognate aids and using AI [artificial intelligence] to improve adoption or get people to change their habits to be more healthy. Now you've got to keep advancing the science and evolve to solve the next problems.

WATERS: What's your day-to-day, has it changed since the time that this lab has started? Because I know you've written three hundred journal articles, several books, and you have twenty patents.

COOPER: Right.

WATERS: You've been busy.

COOPER: I've been busy. I'm still busy. That's not going to change.

WATERS: Do you get to spend time in the lab?

COOPER: I do. I don't know if I would do this anymore if I couldn't spend time in the lab. There are two kinds of absolutes for me, actually, I guess three. If we're not having fun making a real positive difference, I don't want to do it. I want to be interacting with my colleagues, my students, and my staff, every day if possible, but at least **<T: 35 min>** several days per week, and so be directly engaged in the projects. I want to spend some time in the lab every day that I'm in Pittsburgh. Those are kind of the things that I strive for.

I usually start my day in the lab. I've found that that's the easiest way to make sure I get time in the lab. If go to the lab first, and then come to the office, then I'll get time in the lab. If I

come to the office, there's always somebody or some email or something waiting for me to take care of. Then I usually—I have a bad habit—I drink one Coke a day, and I keep them in the lab, and I go down there, and it gives me another hour or depending on what my schedule allows, to go down and work in the lab. Hopefully solving problems, if not kibitz, and see what's going on.

WATERS: Could you talk about some of the major successes that you guys have had at HERL? What are you most proud of? What products you've created?

COOPER: The one thing I'm most proud of is that we actually have HERL. It's still here, twenty-three years later, right? Hopefully, will be here for what will be my legacy. The second proudest thing is all the people that we've trained, the undergrad, the research experience for undergrad students, the postdocs, the doctoral students, and graduate students that have gone out and have taken our message and our knowledge, and build upon it, and really helped build this field. Those are really the lasting accomplishments. All the devices will eventually become obsolete at some time, but hopefully, we've trained people that are creating new devices, like David Algood is the vice president for Permobil. And just recently, Jessica Burkman, who's now working for Nextel [Communication, Inc.], just started her first job, has a severe disability with cerebral palsy. Those are the great things that . . . then, you know, I don't know, the devices, that's like asking to pick your favorite child, right? [laughter]

They're all important in some ways. The Natural Fit handrim and the Surge handrim have really had a tremendous impact on reducing the incidence of rotator cuff injuries and carpal tunnel syndrome and provided years of healthy mobility for people. We're very proud of that accomplishment. The Smart Wheel, which just started as a graduate student, has changed how we prescribe many wheelchairs and fitted, and driven the whole field of wheelchair propulsion ergonomics. Just widely throughout the world.

We worked on the PAPAW [Pushrim Activated Power Assist Wheelchair] with Yamaha [Corporation], the pushrim activated power assist wheelchair, and created an entirely new class of wheelchairs, and they're out there—and that's even in kind of the pre-HERL, of the modern racing chair has its roots in the work that I did. It still has a crown compensator very similar to what I designed. It has the pushrims very similar to what I used. It has fenders that I invented, it has a side carriage that I invented. It's the three-wheeler. I was one of the people to pioneer that. Every time somebody's out there racing, it's using that technology still.

Hand cycles, right? I was one of the first ones to create hand cycles for racing, and now it's a whole sport in the Paralympics, and you see it in marathons, and I participate myself. Our Virtual Seating Coach, I think, can make a tremendous impact on reducing pressure ulcers, lymphedema, and other issues with power wheelchair users. Our Air Chair just came on the market. The first units rolled off at water parks in Texas, and I'm getting emails and links on Facebook of kids for the first time being able to drive through a pool of water, or spraying each other with hoses, fighting on two pirate ships at Morgan's Inspiration Island. So <**T: 40 min**>

it's kind of hard. To me, the most gratifying thing is not the technologies we develop, but the impact they've had on people's lives.

To me, the most fun thing is when I see those. When people do things, actually some, one of them is when people tell me about how wonderful this or that is, without knowing that I'm one of the inventors, or HERL is one of the inventors. You meet them in an airport or something like that, or at a hotel, and they say, "Hey man, you use the Surge handrims, too. I love those. Those things are really cool. You can't believe how they've changed my life. I don't have shoulder pain anymore. How about you? Does it help you, too?"

WATERS: And do you tell them eventually?

COOPER: Eventually, yeah. You let them talk for a while, and say, "Oh, thank you." I usually say, "Thanks for contributing to my retirement." [laughter]

COOPER: They're like, "What do you mean?" I say, "Yeah, I'm one of the inventors. I get a little bit of royalties off of that. It came out of HERL." Then they're like, "Well, who are you? "I'm Rory Cooper." "Oh, you're Dr. Cooper. I read about you on the web." [laughter] That's kind of fun.

Or just now on social media, right, when you can read on somebody's website. "Oh, this changed my child's life," or "This is awesome." That's really what it's about, right, making a positive difference in people's lives.

WATERS: Right. You and your lab are at the forefront of wheelchair technology, I would say.

COOPER: I hope so.

WATERS: What does the future of the wheelchair look like?

COOPER: Robotics. They're going to—we're going to—self-drive. If you look at self-driving cars, that kind of looks, I think the future of wheelchairs to some extent. Giving more people more autonomy. It's sort of the self-driving car, and then on the other side, better human-machine interfaces.

If you look about it, we've always been about that, about advanced technology and human-machine interfaces. Even with manual chairs, it was the physical interface. We still do some of that with power chairs. The power source I think is the other one. You can see cars

moving from internal combustion gasoline engines, and you saw natural gas and propane, and then electric vehicles, like hybrid vehicles. Now fuel cells are starting to come in. The new chair, the air powered, is moving away from standard lead acid batteries. Early on, when we worked with Yamaha, we worked on nickel cadmium batteries, and nickel metal hydride batteries. With the iBot, we did nickel cadmium, nickel metal hydride, lithium ion, and lithium polymer. We've kind of been pushing those for quite some time, but there's still a lot more to be done in alternative power sources as well.

Then the service delivery model sort of got people like Brad Dicianno, Mike Boninger, my wife, Rosie Cooper, and Mark Schmeler, that are working on how you better get research into practice.

How to make that happen faster? How do we speed up the adoption rate? And we have people like Jon [Jonathan] Pearlman who are trying to bring these advances, both in service delivery and in technology to low-income countries, so it's not just the people in the United States, Europe, and some parts of Asia, specifically Japan, Korea, that benefit, that this information and technology gets disseminated worldwide. The impact is we're not local. Our impact is global. Our technology is at work in wheelchairs, robotics, cognate aids, and telerehabilitation or approved service delivery.

WATERS: For you, what does the future of HERL look like? What's next?

COOPER: What's next? Like I said, with the technology areas, more diversity. We've always I think been on the forefront, including people with disabilities, and women in HERL, and I want to grow that. I'd like to make that actually be a model for others as well. So like Jon has been doing to disseminate across the world the technologies and the service delivery, and now Mark Schmeler, Rosie, and Brad have disseminated our technologies across the United States, I think we need to get—**<T: 45 min>** we can influence STEM education and get greater opportunities for people with disabilities, including our veterans with disabilities.

We've grown more into the veterans' space—like veterans' education and veterans' transition assistance—for veterans with disabilities, the opportunities in STEM. I think that's something that will continue to grow in HERL. I'd like to see HERL, like I said earlier, you know, find a naming opportunity so that we have some long-term stability. I think we want to continue to improve our technology transfer. We're generating more patents now. We're working more closely with the technology transfer in the VA, Innovation Center in the VA, and the Innovation Institute at the university. One, to train innovators, so they can go out and start new businesses because there's I think a lot of opportunity there, and to accelerate the pace of research and development into both clinical practice and into products that get in people's hands. I invented the Smart Wheel in 1986. It actually didn't come to market until 2002.

WATERS: Wow.

COOPER: If you look at the Air chair, we started three years ago even just investigating the motors and the feasibility, and it's on the market now. We didn't even start making the first power chair prototype, we had a scooter prototype. We started making a power chair prototype, designed the power chair prototype in June of 2016, and it was on the market by June of '17.

Not that we can do that with everything. You need kind of a balance of things that take longer term and things that are shorter term. But if can be done shorter term, I'd like to have the resources to do that. The other thing is there' still technology has tremendous potential. There's tremendous need for people with disabilities to benefit from that technology.

WATERS: I know you work a lot with the veterans' community, obviously. Can you talk about those interactions, and also what groups specifically that you're working with? Or—

COOPER: Yeah. I mean, Paralyzed Veterans of America has been a supporter forever, but we have great relationships with many of the veterans' service organizations, Disabled American Veterans [DAV], Disabled Veterans' National Foundation, the Wounded Warrior Project, American Legion, and VFW [Veterans of Foreign Wars of the US]. They all support what we're doing, either through the dissemination of information, in some cases financially, some participating in our research, generating research ideas. We're also changing our research to be more consumer-driven, the ideas coming from the consumers. We're doing a big voice of the consumer, voice of the provider study. We've always kind of done that in a less formal way, because of our clinic, at the Center for Assistive Technology, and our relationships with these organizations, but now trying to formalize that data gathering, which is more feasible now with the social media mechanisms for gathering opinions and perspectives and needs.

Then locally, we're very engaged with Mission Continues, Team Red, White, and Blue, the Veterans' Leadership Program, and Steel City Veterans. So that helps. Engaged with the VA itself, the Office of Research and Development, Technology Transfer Innovation, the clinical side, too.

With the DOD [Department of Defense], we partnered with the Center for Rehabilitation Science Research at the Uniformed Services University, EACE, which is the Extremity and Amputation Center of Excellence, which is a joint VA/DOD center out in San Antonio. We've partnered with Walter Reed's Military Advanced Training Center, or MATC, and also the NICoE, the National Intrepid Center of Excellence. The Wounded Warrior Regiment for the Marine Corps, and the Army Warrior Transition Command.

We plan to continue to do those and support things like the Veterans' Wheelchair Games and the Warrior Games. The other thing that's I think the future for us is building our international collaborations. We work with a little bit with University of Alberta in Edmonton, [Alberta], and Martin Ferguson-Pell and his group, and we've got a long relationship with Lee

Kirby up **<T: 50 min>** in Dalhousie University, [Nova Scotia], and Urs Schneider at Stuttgart, and the [Fraunhofer] Institute, and Jongbae Kim at Yonsei University, [Seoul], and Hisaichi Ohnabe at Nagano University, [Ueda],. To continue and build on those collaborations and others, so we know what's going on globally, and get things out globally faster, and also pick up on global advances, and increase our subject pool, too.

WATERS: Right. HERL has long been a magnet for students with disabilities, for people training in. And you work with undergrads . . .

COOPER: We did.

WATERS: . . . as well as graduate students. Was that a natural progression, or was that one of your goals when you started?

COOPER: That was one of my goals. Yeah. Yep. I wanted a lab where, one, you could do soup to nuts, where you could come up with an idea, develop it, create it, test it, and then try it in the clinic, and then disseminate it broadly, all the way from small scale focus groups to multi-site clinical trials. But the other part is to create an inclusive workplace. You know, it's kind of back to the disability advocacy days of, "Nothing about us without us." There was no way that we were going to create HERL without having it, having people with disabilities have a substantial role in HERL. At all levels.

WATERS: Do you have any questions?

MARTUCCI: I wanted to ask about what it was like leaving California behind and moving to Pittsburgh. I know when you had a job offer at one point in Illinois, your wife said, "I'm not shoveling snow anywhere outside of Germany." [laughter] So how did that transition go?

COOPER: Well, the early transition was not easy. We arrived in twenty-seven inches of snow in Pittsburgh and were snowed in for a few days. Fortunately, have some great neighbors that helped us out. My wife still doesn't have to shovel snow. We've had friends and neighbors be able to help us with that over the years. I had to leave . . . she had to leave her family in Germany. We had to leave our family. I left my family in California. That was difficult. The four seasons there were a bit difficult.

On the other hand, the veteran's community and the disability community have been very friendly, very welcoming of both of us, and we're now deeply rooted in the Pittsburgh community, and have some wonderful relationships. I'll tell you, the other part that is a

challenge then, and actually exists to be a challenge, is California is much more progressive on inclusiveness, about people with disabilities and just people in a more inclusive culture. Pittsburgh's a friendly Midwestern city, or at least it perceives itself to be a Midwestern city. I realize from Philadelphia, [Pennsylvania], it's considered a primitive backwater. But the culture is changing, and I think bringing companies like Google [LLC], and as the University of Pittsburgh grows, and Carnegie-Mellon [University] is very diverse, that the culture will change. The culture has been changing for the positive, to be more inclusive, at all levels. But it's still different.

MARTUCCI: In terms of both the city and the university, how was that in terms of accessibility, and sort of how has that changed over time?

COOPER: Pittsburgh is geographically challenged for accessibility, right? It's an older city, and there's lots of hills, and so that makes it difficult to . . . you can put curb cuts in, but if it's on a really steep hill, it's still not much help. But the city at least is taking that seriously, doing an assessment for sidewalks, and working on public transportation. Employment is kind of the big barrier. There're physical barriers to employment, and there's the biggest barrier, actually, to **<T: 55 min>** employment for people with disabilities—from my perspective—is the social barrier, getting people to understand. To welcome people with disabilities in the workplace and to be understanding of their needs, going beyond accommodation in the legal aspects. I see Chancellor [Patrick D.] Gallagher starting to make those changes at the University of Pittsburgh, but I think that for a long time, it was more a legal obligation, rather than a moral imperative.

MARTUCCI: When you first came here, did you have . . . I mean, you said you were sort of in a bathroom and a locker room. Did you have colleagues that you were you part of a community at the university when you got here, or were you sort of on your own?

COOPER: I had Mike Boninger, and then Rick Robertson came out for a while from California, and then he went back and started his own business. I felt like in some ways I had to build my own community. There were very few faculty with disabilities on campus. There were not really many people working in this, and I was a bit isolated from my colleagues in the department. Originally, they were in Forbes Tower on campus, and then they moved out to U-PARC which is the University of Pittsburgh's applied research center, about ten miles from here. That was a challenge. It made it particularly hard, when you think about we left our family, we didn't have that support, and then we had to . . . . At work, I was isolated. I will say that the people in the VA were wonderful, and we built a community around the VA, and they always have been very, very supportive of what I do.

MARTUCCI: How was it finding accessible housing in Pittsburgh?

COOPER: Almost impossible. We live about eighteen miles outside the city in a beautiful ranch house. We had to do a lot of modifications to make it accessible. Now it's fully accessible. That was a bit of a challenge, too, because we had to find contractors and things like that. So literally, we had to stay in a hotel for a while, while our house was made accessible. Accessible, affordable housing, not only for low-income people with disabilities, but all income levels in Pittsburgh is a challenge, and modest income people, too. That's something the area still needs to work on. The university also just needs to work on providing more housing for students with disabilities, especially graduate students and postdocs, so they could come here and have a place to live until they find a place, especially since there is such a shortage of accessible housing.

MARTUCCI: The university . . . .

COOPER: When I first came here, it was almost impossible to find a dentist, for example, right?

MARTUCCI: What is the challenge with finding a dentist?

COOPER: They just weren't accessible. They were upstairs, or the dental exam rooms were too small to get a wheelchair in, or they had a dental chair that you couldn't transfer into. All of those . . . I mean, actually, a lot of the doctors' clinics. Fortunately, I'm eligible for the VA, and the VA has sort of national standards. But outside the VA, in the private sector hospitals, and even UPMC [University of Pittsburgh, Medical Center] at the time, it really wasn't until the late 1990s or really, it was in the early 2000s that UPMC started looking at how do you become more accessible. As an employee, there are a lot of businesses, including the University of Pittsburgh, where they can make improvements in accommodations.

MARTUCCI: Are the buses in Pittsburgh accessible?

COOPER: The buses are pretty good, and the kneeling buses have been a huge breakthrough for accessibility. The problem is that there's still not as much. Ideally, every bus would be fully accessible, and every driver would be trained and accommodating. Physically, we're getting better there. There's still another thing, and it is about attitudes, right? It takes a little longer for a person in a power chair to get on the bus, and the bus driver feels anxious about the other passengers. We have to get to the point where people just accept that that's the way it is. We should just relax a little bit. That extra thirty seconds isn't going to kill anybody.

MARTUCCI: Yeah. I think that's it.

WATERS: Do you have anything you want to add that we didn't cover that you would like to . . . ?

COOPER: Well, I think we should **<T: 60 min>** talk about since [it's] Pittsburgh, we have all the self-driving cars and stuff here, and I think that has a lot of potential for people with disabilities and older adults, but it also has a lot of potentials, if we're not careful, to leave them behind. We had that problem with smartphones when they first came out. They're wonderful, like people who are deaf can text, and texting is even probably more ubiquitous than calling on the phone. That was a tremendous breakthrough. But then everybody got rid of keyboards and wanted touch screens, and they made this device that everybody was using largely inaccessible to people who are visually impaired. Now voice navigation has got to the point where it's pretty good, and it's been more welcoming, but you've got to be careful that these technologies, as they are developed, are also inclusive.

I think self-driving cars have tremendous potential, if you can't drive at all, and you can have a self-driving car. But you've got to be able to find the car. The car's got to find you. You've got to be able to get in it. You've got to get your stuff in it. You've got to be able to get out of it. I think that's [what] we have to be aware of as well.

WATERS: Any other questions?

MARTUCCI: I don't think so.

WATERS: Thank you so much for your time.

COOPER: My pleasure. Thank you.

[END OF AUDIO, FILE 2.1]

[END OF INTERVIEW]

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