AMERICAN INSTITUTE OF MINING,
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ORAL HISTORY PROGRAM

Enrique Lavernia: The Super Dean with a Passion for Research

2020

PREFACE

The following oral history is the result of a recorded interview with Enrique Lavernia conducted by Haiming Wen on February 23rd, 2020. This interview is part of the AIME and Its Member Societies: AIST, SME, SPE, and TMS Oral History Project.

ABSTRACT

Highly recognized and humble, Enrique Lavernia grew up in Puerto Rico, earned his Ph.D. in Materials Engineering from MIT, and is in the National Academy of Engineering, among his numerous accolades. Lavernia's research on spray atomization deposition, nanostructured materials, and mathematical modeling of advanced materials and processes is notable. A Dean like no other, Lavernia held tenure at the University of California, Irvine as a department chair for 4 years, and went on to have tenure as dean of the UC Davis College of Engineering. During his time at UC Davis, Lavernia evolved the College of Engineering of the university into one of the nation's fastest-growing and most prestigious engineering schools, increasing diversity and student enrollment by 22%. As Dean, Lavernia's focus was research and people and how it brings together different cultures. Lavernia believes the Golden Era of materials science and engineering is now and its interdisciplinary perspective will bring people together. His advice to students is to engage in your passions and let your passion for learning drive you.

TABLE OF CONTENTS

PART 1

00:19 Education, An Important Family Value

Wen:

Today is Sunday, February the 23rd, 2020. I'm here today with Dr. Enrique Lavernia. Dr. Lavernia is the provost and the executive vice-chancellor, and a distinguished professor of material science and engineering at the University of California, Irvine. He's also a prominent member and fellow of the TMS society. This is Haiming Wen, assistant professor of material science and engineering at Missouri University of Science and Technology. We are doing an oral history capture, one of a series by AIME, American Institute for Mining, Metallurgical, and Petroleum Engineers has been doing over the past several years on prominent members of its member societies. Thank you so much, Dr. Lavernia, for finding this time while we are at the TMS annual meeting to capture your story to share with peers in the field and also future generations. So let's start at the very beginning; tell me about where you grew up.

Lavernia:

Well, let me start by thanking you, Haiming, and AIME for this opportunity to share some of my history. So, I was born in Cuba, my family left in 1965, fleeing the regime of Fidel Castro. We ended up in Florida for a while. I grew up in San Juan, Puerto Rico, where I completed my high school before going to college in the United States.

Wen:

What did your parents do for a living?

Lavernia:

So my late father was an electrical engineer who worked for IT&T, and my mother was a biology professor. So from an early age, education was a very important component of our family and our values. [it was] Something that became very apparent when we had to flee Cuba in 1965, only being allowed to take their education as we left the Island.

Wen:

Who and what influenced you to become an engineer?

Lavernia:

That's an interesting question and a difficult one. I guess inherently; I've always been interested in how things work. When I think about our older son, Alejandro, from a very early age, it was pretty clear that he was going to be an engineer, just because of the things that attracted his attention. So despite the fact that my father was an electrical engineer and my mother was a scientist, I'm not sure that at an early age, that was really a factor. Although, of course, subsequently, they became very important in the way I grew up.

03:27 Leaving Puerto Rico to Attend Brown University and Explore the World

Wen:

So let's talk about your education. So you got your bachelor's degree from Brown University in solid mechanics. So why did you choose that school?

Lavernia:

I laugh; that was a very difficult time for me. Growing up in Puerto Rico, the goal of every high school student was to graduate and leave the island for new experiences. Not because we did not enjoy living in Puerto Rico, but after being there as a young high school student, you really wanted to explore the world. So I applied all over the country, knowing very little about the differences in state's climate campuses. And so eventually, my final decision came down to Cornell, Brown, and Yale. My father was quite strict and conservative and would not allow me to visit any schools. His mantra was, you're going to go to the best school, we'll figure out a way to pay for it, but you don't need to see it.

Fortunately, Cornell invited me to visit the campus, and I visited Cornell University in the middle of winter. I want you to imagine what that was like for someone coming from Puerto Rico who had never seen snow. So Cornell got eliminated pretty quickly. Yale was having financial difficulties at the time, and so Brown became the school by default. I decided to attend. I had never been to Providence, Rhode Island. In retrospect, it was a real blessing. It was a tremendous educational experience for me, but it was really by default.

Wen:

So why did you choose solid mechanics as your major?

Lavernia:

So the undergraduate curriculum at Brown University has what's called a common core for the first two years. So the first year, you took courses with all engineering students, including fluid mechanics, statics, dynamics. Sophomore year, I took my first course in materials science and engineering, and very quickly, I became enamored of the field. I ended up working in the laboratory of a professor at Brown. At the time, Brown was probably the best place in the world for fracture mechanics; it's the birthplace of fracture mechanics. And so again, I ended up in that field purely because I happened to be at Brown, and I happened to work in a laboratory of someone who was working in fracture mechanics.

06:22 Intellectual Giants and Admired Mentors – The Significant Influence of My Professors

Wen:

Was there any professor who had a significant influence on you?

Lavernia:

Oh, yes, many. Brown had then and continues to have exceptional faculty. By that, I mean who are not only intellectual giants but also very dedicated to undergraduate teaching. So I was blessed with many, many faculty who influenced me later in life. Professor Fong Shih, who taught fracture mechanics, later became the president of Singapore National University and was the founding president of King Abdullah University of Science and Technology. He's someone with whom I am still in touch today. He was particularly influential, a great teacher, and a very kind man. Professor Robert Asaro and the late Jack Duffy, I worked in their laboratory, so they were my first introduction to research.

Then finally, Professor Sheldon White, who was an adjunct faculty at Brown, from Texas Instruments. I took a class in failure analysis for him, my junior year. I gather I must have done well because he invited me to be his TA my senior year. I had already started a five-year master's and PhD at Brown. It was Shelly White who essentially said to me; you should apply to MIT.

And I said, "Why? I'm happy here; I love Brown. I like the research I'm doing; I'm into a PhD program." He said, "It's a great program, but MIT is the largest material science engineering program in the country, and you'll learn a different perspective." So he was very influential in what happened to me.

Wen:

I guess that also explained why you chose MIT for your PhD. Also, you'd already developed your interest in materials engineering, and so that's why you chose materials engineering for your PhD.

Lavernia:

Yes. Certainly, I had developed a passion for it by my junior year as an undergraduate, and then as I pursued my masters and PhD at MIT, it really became a passion.

08:59 Nicholas Grant and My PhD – Shaping My Passion for Research and Publication

Wen:

Your PhD advisor was NJ Grant, correct? What was his full name?

Lavernia:

Nicholas J. Grant.

Wen:

Tell me about your advisor's influence on you.

Lavernia:

[It was] Very, very strong. I think Nick is responsible for the philosophy that I operate in my research group. He shaped my absolute passion for having a large international group of graduate students. He shaped my passion for publication, for research, for trying to do the best work that I can. A very interesting human being, who was not just a great scholar, but a fascinating individual. Nick used to be a football player at Carnegie Tech before he became a professor, so he was very physical. Handball was his game, so I learned to play handball. Despite the fact that he was mid 70s by the time I got to MIT, there was a real struggle to take a game from him, and he was very proud of that.

Wen:

What was your PhD dissertation about?

Lavernia:

So I worked with Nick Grant on the concept of spray forming. The idea was to disintegrate metal with high

speed, high energy gas, a concept that has existed for a long time. But what was new, was rather than allowing the droplets to solidify individually, was to collect them at a point in the phase diagram where you had multiple phases, solid, liquid principally, and thereby captures some of the metastability of the atomization stage in a consolidation in one step. I worked on aluminum alloys and demonstrated that you could then engineer the chemistry to take advantage of the cooling rate during that position, and you could add things like zirconium, zinc to enhance mechanical behavior.

Wen:

So this is a rapid solidification process. So why do you want a rapid solidification?

Lavernia:

Rapid solidification gives you a kinetic pathway to bypass the thermodynamic constraints that are placed by phase diagrams in mixing insoluble elements, developing structures and compositions that you can't under equilibrium conditions, and thereby able to engineer materials with unusual properties.

Wen:

So this is far from equilibrium processing?

Lavernia:

Correct.

12:01 Finishing My PhD to Becoming a Research Associate – Meeting My Wife at MIT

Wen:

You finished your master's and the PhD degrees in about three years and a half. How did you manage to do it so quickly?

Lavernia:

I don't know how to answer that, Haiming. Fundamentally, I guess I give goals 110%. I worked really hard, was very excited by the energy in the field at the time, in doing research, publishing. I was anxious to continue to make contributions. Completing the PhD, and then staying as a post-doc gave me a certain intellectual freedom that was very productive for me.

Wen:

So after you completed your PhD, you stayed at MIT for another year and a half, first as a post-doc and then as a research associate. So, what projects did you work on? Were they a continuation of your PhD research?

Lavernia:

Some of them were. We had a project with that essentially involved applying the same principle of spray forming, but now to fabricate a continuous sheet. Sort of like a twin casting approach, except that the source metal, rather than being a poured ingot, was spray distribution of droplets. The other personal

reason to stay as a post-doc and principal research scientist was, I met my wife (Julie M. Schoenung) at MIT, a fellow graduate student, and she was finishing her PhD. So it was a perfect pretext to stay and do some more work.

13:55 A 26 Year Old Assistant Professor at UC Irvine – Building a Lab in Nine Months

Wen:

You became an assistant professor at the University of California, Irvine, in 1987, at the age of 26. You joined the MAE department. There was not a materials department, correct?

Lavernia:

Correct.

Wen:

How was the transition to a faculty position?

Lavernia:

Terrifying. It's a sudden transition that, in so many ways, you're not prepared for. You spend your time doing research. Although, I think I was very blessed by having an advisor who engaged me in writing proposals. So I had a sense of what that world was like in writing and contacting federal agencies for research funding, so I was exposed to that. But, it's never the same when you have the responsibility of doing it on your own, on top of building a laboratory, on top of hiring graduate students, on top of preparing notes to teach, etc. On the face of it, it was really overwhelming. Nick gave me a very hard time when I told him that I was leaving to become an assistant professor at UC Irvine. His response was, "UC where? Who's ever heard of that place, Enrique?"

And I said, "It's growing, it's a campus that you'll see, just wait. It's a beautiful part of the country." He's like, "you'll be back in nine months." So I decided to head to Irvine. My first experiment was completed, and I'll tell you why I remember this. Nine months after I arrived, I managed to build a laboratory with two undergraduates. The day of the first experiment, I did two things. I invited them for a steak and lobster dinner at my house, and I called Nick Grant, and I said, "guess what, the lab is working, and I ran my first experiment. " In typical Nick Grant manner, he said, "I knew you were going to do it." So he had a very tough but paternal personality that I learned to appreciate as the years went on.

Wen:

As a very young assistant professor, only 26 years old at that time, did any students mistake you for a student because you were probably only a little bit older than your students, especially your graduate students?

Lavernia:

I had graduate students that were older than me. Yue Wu, who's one of my first PhD students with whom I wrote the book "Spray Atomization and Deposition," was older than me. I was blessed with generations of students who have been fantastic. People like you, Haiming, dedicated, hardworking, and just very respectful. That was never an issue, but yes, that's something that always happened when I would go out,

and I can't say that it bothered me because it really didn't. But I thought it was always funny when I would show up with my students.

I remember showing up at some analytical laboratories that had been doing some research, some atom probe tomography for us. I showed up with a group, and the director of the lab said, "I thought I told you that next time you come, you have to bring your professor." I sort of sheepishly raised my hand and says, "that's me." It ended up being a great relationship eventually.

17:58 Mentoring and Building Relationships with My Graduate Students – Making Time to Talk

Wen:

How did you mentor your graduate students, especially your older graduate students?

Lavernia:

So, my mentorship style goes back to my days in Nick Grant's group. Nick was a very busy guy, and yet if you wanted to see him, he always found time. I hope my students feel that I did the same because I still do. When my students want to see me, despite my current job, I find the time to talk to them. So I think it's important for them to develop an independent passion for what they want to do. I don't believe in micromanaging my students, so giving them the intellectual space to do research and to find problems that are really interesting, but always to be there when they have questions, whether about the research or about their own lives or issues. The advisor-student, graduate student relationship is unlike any other relationship that I've ever seen, and it's one that's very special.

Wen:

Did you have any senior faculty member, or members, to mentor you because you were a junior faculty member?

Lavernia:

So at the time, I joined the mechanical and aerospace engineering department at UC Irvine; the senior faculty was Farghalli Mohamed, who is still there. He's retired, but he's still there; he still comes to see me. Farghalli has been just a wonderful and legendary figure in my life, both professionally and personally. He was a great mentor, very caring human being who was always there to answer questions and guide me. So at Irvine, he was probably the most influential figure.

19:59 The Army Research Office – Funding My Research for 33 Years

Wen:

What was your first funding agency? And what was your first externally funded project?

Lavernia:

Oh my goodness! I remember it exactly. The Army Research Office, ARO, funded ~~one of~~ my first federally funded research project. To essentially expand the concept of spray forming with the idea that I had to add ceramic particles to spray form an in-situ composite. Some very interesting problems come out of the interactions of these ceramic particles and two-phase droplets, as they are directed towards a substrate.

They funded me then, and here's the amazing thing, I still have ARO funding 33 years later. [I am] Very grateful to ARO for their support.

Wen:

Was it competitive to get external funding at that time?

Lavernia:

It was, and I spent my first year, I think I wrote 16 proposals, but I will say that as competitive as they were back then, it's even more competitive today. The number of researchers has increased tremendously. The budgets for research have not. So, the pressures were the same. The statistics probably show that it's even more difficult today than 30 years ago, but certainly, it was not easy.

Wen:

How did you distinguish your research from your PhD advisor's research?

Lavernia:

That's a very good question. So as a post-doc, I knew that I wanted to work in composites when I went on my own. So all of the composites work that I did started when I became an assistant professor, not as a post-doc.

22:07 Young Investigator Awards from NSF and ONR – Research on Composite Materials

Wen:

So you got Presidential Young Investigator (PYI) Award from National Science Foundation and in 1989 and a Young Investigator Award from the Office of Naval Research in 1990. What were the research projects that you worked on?

Lavernia:

So with ONR, and again, ONR funded me for many, many decades. The ONR work, Haiming, involved developing a hybrid microstructure. I got interested in the concept of a composite, where you at a secondary particle for, say, mechanical behavior strength, [such as] stiffness. So then the concept that I proposed back then was, what if you add multiple particles for different physical or mechanical properties in the same structure? And I think we demonstrated that concept with high-damping materials, which the Navy was interested in; energy dissipation in the structure.

So the idea was to add particles of graphite. The planes and the graphite particles displaced past each other, a hexagonal crystal structure and absorb energy effectively. Then add, I think, Silicon carbide or alumina for strength and mechanical properties. The NSF PYI Award was given to me based on the overall fundamental issues associated with these spray forming processes and composites and spray form materials, and looking at strengthening mechanisms, looking at the formation of non-equilibrium structures, supersaturated sort of solutions, for example.

24:03 Tenure in Four Years, Publishing Over Twenty Papers A Year at UC Irvine

Wen:

What was the first course that you taught at UC Irvine?

Lavernia:

The first course that I taught? The first course that I taught at UC Irvine was kinetic processes in materials. It was a graduate course. The reason I taught a graduate course, as an assistant professor, they gave you some teaching release the first year. So I could spend my first quarter building the lab and then a second quarter and third quarter teaching. Kinetics was a class that I took from professor Don Sadoway (one of the best and most challenging teachers that I have ever had) , with whom I'm still in touch today at MIT. Hardest course that I've ever taken, but possibly the one that I learned the most in. So I enjoyed that course, and it became a course that I taught for years, and that was the first time I taught it.

Wen:

You got your tenure in only four years, and you were promoted to an associate professor in 1991. How did you manage to get your tenure so quickly?

Lavernia:

I think that's more a reflection of the great research group that I had and the productivity that the PhD students, visiting professors had, and a very supportive environment that I was working in at UCI. I never thought that UCI was the place where I was going to stay for the long-term. When I arrived there in 1997, I figured I'll stay here for a couple of years and move. But I think at the end, it was difficult to find a reason to move. I was surrounded by great colleagues; politics were really at a minimum. I could do my teaching, my research and not be bothered with too many things, and I stayed. I think that things worked out, I ended up getting a few awards, a number of research grants, and they probably accelerated me so that I wouldn't leave, I guess.

Wen:

In the four years as an associate professor, you were already extremely productive. You were publishing more than 20 papers each year, which is, of course, a lot. How did you manage to do that?

Lavernia:

No sleep. I guess there's an inside joke in my family where I argue that OCD (obsessive Compulsive Disorder) is not really a disorder; being obsessively compulsive is not a disorder; it's perfectly normal. I'm pretty obsessive about my work. I like what I do, but there's no question that having a very large, very productive research group of really smart PhD students and post-docs is an absolutely essential part of any success that I've had, and great colleagues, a lot of great colleagues. I love working with colleagues around the world. Nick Grant gave me some advice when I was leaving for Irvine that I didn't quite appreciate until later, which was, and it's very simple, but it's very powerful, which was only work with people you like. It took me a few years to figure what he meant. Indeed, you develop relationships with colleagues that you just truly enjoy working [with] and getting to know them personally but doing great work together. Those relationships tend to last forever. Whereas if you force a relationship with somebody, you're not particularly friendly with, it's not as much fun.

28:01 Finding My Great Graduate Students – Matches in Research Excellence and Personality

Wen:

You mentioned that you had very good graduate students. So how did you find them? Did you need to take extra effort to find them?

Lavernia:

Something that I'm very proud of that I still do, and it's very difficult, and possibly because when I started applying for faculty positions when I was an MIT, looking for faculty positions, a difficult time to look for faculty positions, I wrote many, many letters that went unanswered. So, I pledged that I would never do that. So, I respond to every email, every letter that I get from a potential graduate student, even if it's just to say, "listen, I appreciate your writing. I don't have a position right now for you. Good luck." But the fact that you respond, I think, sends a message that you have a certain style. I engage people from an early stage, and I can't tell you how many times somebody would come back a semester later. [They would say,] "[I've] been reading your papers, how about now?"

Okay, let's see. So, looking for that match in not just research excellence but personality, and I've been really fortunate to have had such great graduate students.

29:32 Growing In My Career at UC Irvine – One of the Youngest Full Professors and Department Chairs

Wen:

After four years as an associate professor, you were promoted to a full professor in 1995, at the age of only 34. About two and a half years later, in 1998, you became the department chair at the age of only 37. Would you have been the youngest full professor and the youngest department chair at that time at UC Irvine?

Lavernia:

I can't answer that. I don't really know. It's been surprising. I don't have the bandwidth in my head to plan these things. Some people do it; I admire for them; I just don't have that bandwidth. I was doing what I was doing and working really hard and ended up on a search committee for the Dean of the school of engineering, who came back in 1997. I went on sabbatical to the Max Planck Institute in Germany in 97. In fact, my daughter's first two words were, "Nein [no] Papa." Fact is, I tell her you've been arguing with me since you can speak; it's still the case. So, after I returned, they asked me to become department chair. It's not something that I planned for, asked for. I was very flattered, and so I agreed to do it. Academic progressions are interesting; some people are very good at planning and lobbying, and getting them. I just don't have the bandwidth to do that.

Wen:

Was this transition to half administrative position smooth?

Lavernia:

So, it was a difficult time because material science and engineering grew within the department of mechanical engineering at UCI. I was faculty member number 11 in the department of mechanical and aerospace. By the time we left, we were probably closer to 20 or 22. Chemical engineering had been a

program that had started at Irvine a few years before. So the opportunity came up to join the material science and engineering faculty with a chemical engineering program and start our own department; that was the chemical and biochemical engineering and material science department. The initial person who worked through the transition was Henry Lim, who was the director of the chemical engineering program, a great gentleman, very great colleague. But shortly thereafter, they asked me to become the chair. So it was a challenge in the sense that you were bringing two very different cultures together, the chemical engineering and material science and engineering culture are quite different.

On the surface, it seemed like a good idea because chemical engineering tends to have very large on the graduate enrollments, which material science or engineering does not. Material science and engineering has a very productive research portfolio, which chemical engineering tends not to have. So, it seemed like an ideal group, and it worked fine. There were challenging issues in trying to assign teaching, for example, and trying to assign a balance to the needs of both groups. So that took a lot of time and energy, but it certainly was a time where I learned the power of transparency as a chair. I found that very difficult problems could be solved if you brought people together and you shared the relevant data. Engineering faculty tend to be very logical, and so when presented with data to make a decision, it was much easier than lack of transparency when then, you end up with reactions of things that perhaps are going on behind the scenes that are really not. So that was an interesting transition for me.

34:27 Pressing on With Research – Nanostructure Materials and Spray Atomization Deposition

Wen:

Your administrative duties did not seem to affect your research productivity at all. In your four and a half years as the department chair, you publish about 107 papers. You were elected as a fellow of ASM International in 1998 and the fellow of AAAS in 2000. How did you manage to maintain the high research productivity when you were a chair?

Lavernia:

It's always hard to look back in retrospect, in hindsight, and see how things happen. But perhaps, it is because the same principle, the same management principle, that I use with graduate students also applies to faculty, which is appoint really productive, really good faculty to positions of responsibility in the department. Let them do their job and make sure that people are responsible, but don't micromanage them, and the same thing with staff. I had terrific staff in the department. I had terrific colleagues who did their job as a vice-chair from the graduate studies, vice chair for research. I think when you are busy, and you don't have time for things that are not important, [it] focuses your efforts, so I was able to continue to do research. I also think that keeping an active research program is a very effective way for an administrator to have a soapbox to help the rest of the faculty be productive. If they see that you're still productive, there's no reason why they can't be productive.

Wen:

You made tremendous contributions to the fields of spray atomization deposition forming, which we talked about a little bit. It seems that about 1995, you started to work on cryogenic milling to fabricate nanostructured materials and the study of their physical behavior. Since then, this area has become an important part of your research. You made seminal contributions to this area. For the benefit of people who are not familiar with the field, can you give more details on this? Why nanostructured materials and why cryomilling to make such materials?

Lavernia:

So I've been thinking about this, and there's a very natural progression that I now understand; I'm not sure I understood at the time. So, as I shared with you when we started the work on hybrid composites, where you add multiple particles for different physical properties, and we were looking at the influence of graphite particles and ceramic particles for damping, and also for strength and stiffness, we also found that another mechanism that was very effective in dissipating strain energy are grain boundaries. Well, what is the best way to increase the density of grain boundaries in a material is a nanostructure. So, we started then trying to understand how do we effectively make a nanostructured metal, top-down that is breaking the metal structure, increasing dislocation density. These get rearranged in walls, eventually grain boundaries. That was well known, but we needed to do so in a way that these particles would be thermally stable because it wasn't good enough to generate the nanostructured particles.
If when you consolidated them into a bulk structure, they coarsen, the thermodynamic driving force for a nanostructured particle or grain is very, very large. They'll sometimes coarsen at room temperature.
So, after some research, we landed on the mechanical milling technique, which has been around for a long time. However, we gave it the twist of doing it under liquid nitrogen for a number of reasons. One, the liquid nitrogen environment minimizes oxide contamination. There is always some oxygen, but it's significantly lower than doing mechanical milling in other media. Two, the cryogenic temperature promotes low recrystallization dynamics, and so you get to nanostructure faster rather than eight hours, you can do it in a much shorter time. Then three, and most significant, the nitrogen forms a nitride phase that stabilizes the grain boundary in a dramatic way. So, we reported grain stability up to 0.77 of the melting point, which is if you remember your thermodynamics, at about half of the melting point, everything grows. So this was remarkable. Why was this important? Because we could take these cryogenically milk powders and consolidate them into large structures, which would retain grain sizes of 80 to 90 nanometers, which was our goal.

39:59 Embracing the Unexpected – Becoming the Dean of the College of Engineering at UC Davis

Wen:

After four and a half years as the Department Chair at UC Irvine, UC Davis snatched you, and then you became the dean of the College of Engineering at UC Davis in 2002, at the age of 41. How was the transition?

Lavernia:

Well, that's an interesting story, Haiming. So, sometime around the late 90s, 1999, 2000, I was attending a workshop in Montreal, Canada, with my colleague, Professor Zuhair Munir, from UC Davis. Zuhair was, by the way, another great mentor and friend. He was the first person to invite me to be co-editor of a journal back then when I was very young. Zuhair left the workshop; he was seated next to me and came back, looking clearly flustered. And I said, "What's the matter, Zuhair?" He says, "Well, the chancellor just fired the engineering dean and appointed me interim dean." I said, "That's great." He says, "No, it's not. That's not something I want to do." It turns out; there was a good reason for it; Zuhair's spouse was facing health challenges at the time.

Anyway, I forgot about that interaction, and shortly thereafter, I got a phone call about applying for the engineering dean position at Davis. This was in 2001, and it really caught me by surprise for two reasons. A: as I've said before, I certainly never had a strategic plan to become chair there, then dean. I was trying to do my job as chair and continue my research. The first time they called me, I called Zuhair, and I said, "You'll be a much better dean than I ever will be." That's when I learned that there were personal reasons why he

did not want to be dean. After thinking about it, I actually said no. I didn't think things were ready. I was in the middle of a number of research programs, personnel issues at Irvine, that it just didn't seem like the right thing to do, and I didn't want to pursue it if I wasn't serious.

So, fast forward a year, and they came back. The search failed that year, and they still were interested in me applying. Things had changed, and I said, "Okay. I'll come." And it was a very easy interview. Then Provost and Executive Vice Chancellor Virginia Hinshaw, whom I loved working with, literally just convinced me to become dean, and it was an exciting time. Davis was growing engineering. Julie went and interviewed and liked her colleagues as well. But my main condition was that I would be allowed to continue my research program as dean and move my research group from Irvine and my laboratories. And they agreed.

Wen:

Did you like Davis?

Lavernia:

Davis was the perfect town for us for the time in our lives. We had two young kids. This is '02; Alejandro was seven, and Laura was six. Their reaction that they had to the potential move is so characteristic of their personalities. When we told Alejandro, "We're thinking about moving to this town," he said, "Oh! Go ahead, but I'm staying in my house," and Laura said, "Oh, cool. When do we leave?" Which, to this day, really characterizes their personalities. It was a great place for them to grow up. Davis is a very family-friendly town with terrific schools. They bike everywhere, great music programs. It's a great community for a young family to grow up.

44:29 A Dynamic Time – Increasing Diversity and Evolving UC Davis into a Prestigious Engineering School

Wen:

Were there any challenges for the College of Engineering when you started?

Lavernia:

Yes. So, I think by the time I left Davis to return to Irvine in '15, I had hired over 100 faculty, over half of all the faculty in the School of Engineering, with zero net new space. As you know, as a faculty member, space is the final frontier, someone once said. It's very challenging to grow a program with no net new space. Fortunately, we hired wonderful faculty. The school did really well, and working with department chairs and the administration, we managed to put people in different places and find them all labs and offices, but it was not an easy task.

Wen:

So, you served as the dean for six years and the provost and the executive vice chancellor for two years, as UC Davis transitioned to a new chancellor. Then you stepped back to the dean position and stayed in the position for another four years and a half. During the tenure as the dean, the UC Davis College of Engineering evolved into one of the nation's fastest-growing and the most prestigious engineering schools in the nation. Nine members of the faculty, including yourself, became members of the National Academy of Engineering. Research expenditures doubled. I think you mentioned that you hired more than 100 faculty members. Student enrollment increased by 22%, with significant increases in female and Hispanic

undergraduates. So, how did you make all these things happen?

Lavernia:

So, the fabulous support from the administration, provost, and EVC Virginia Hinshaw, tremendous commitment to diversity, which we all believed in very strongly, increasing the female faculty in the engineering school, as well as graduate students. Very active faculty members, who were willing to work really hard to both increase the size of the enrollments but also help us recruit remarkable faculty, both junior and senior, who could come to Davis and help us build a special College of Engineering. It was a time of growth and a lot of energy at the campus. The Davis campus has physical space, so it had places to grow. Having said that, despite the lack of new buildings for engineering, we did manage to renovate a lot of older buildings and try to find spaces for the faculty. But it was a very dynamic time in the College of Engineering.

PART 2

00:16 Increasing the Impact of "Materials Science and Engineering: A" as the Journal's Editor-in-chief

Wen:

Meanwhile, you have also been the editor-in-chief for the prestigious journal, "Materials Science and Engineering: A." How long have you been the editor-in-chief? What are your responsibilities, and how do you like them?

Lavernia:

So, I became involved with the journal, "Materials Science and Engineering: A," about the same time I became chair, circa 1998, initially, not as editor-in-chief, just as editor. This was important to me, because even as a graduate student, I always found that MSEA, as we call "Materials Science and Engineering: A, Structural Materials," was a journal that, then the editor, I still remember was Professor Herb Herman from SUNY [Stony Brook University, New York]— This was a journal that I always felt had rigorous reviews but offered good feedback to the authors, unlike other journals who would simply just, sort of, reject, or accept the paper. I always found the MSEA reviewers to be quite constructive. So, when the opportunity came, I was certainly flattered and willing to help the journal over the years. I can't really remember when I became editor-in-chief, well actually I do, I'm going onto my tenth year. So, it was then, in 2010, around that time, that they must have asked me to become editor-in-chief. As editor-in-chief, my responsibility is, on one level, like other editors, process papers, assign them to reviewers and make decisions on their acceptance, modification, or rejection. But, as editor-in-chief, it includes the responsibility of working with the other editors to set policies, change scope, adjudicate conflicts, and it's been a terrific team. In fact, today, my one o'clock meeting is the editorial board meeting for MSEA.

Wen:

So, what is your vision for the journal in the next five to ten years?

Lavernia:

So, the MSEA has increased dramatically in terms of impact factor. Our goal is to continue to increase the impact factor. I think it's around four right now. We'd like to have an impact factor closer to that of ACTA, which is closer to 10. [We will be] continuing to serve as a unique place where research on structural

materials is presented. In recent years, the additive manufacturing (AM) community has found the MSEA a very attractive venue, in part because our focus on the actual material science and engineering issues of AM is unique. It's not just the process, but actually the phases, the microstructure, the non-equilibrium issues related to AM. So, continuing to work on cutting-edge fields, multi-component alloys, is also becoming quite popular in the journal, if you look at the paper submission. So, we'll continue to both explore strategic areas as well as make sure that the community sees us as the place to publish research on structural materials.

03:56 Research as Dean – Up-and-close Insight into my Faculty's Experiences

Wen:

On the research side, despite your full administrative duties, you maintained a large research group, raised tens of million research dollars, and acquired extensive laboratory facilities. You published about 250 papers during your tenure at UC Davis. How did you manage to be so successful in research when you have full administrative duties?

Lavernia:

Haiming, again, hindsight is 20-20. It's always hard to say. I think, perhaps, it's the same philosophy that I've used as an advisor and department chair, which is: hire people who are smarter than you are, let them do their job, and support them. The role of the dean is particularly important in setting an example for the faculty. So, I found that having a productive research portfolio, again, gave me the perfect platform to tell the faculty that, if I'm still bringing research, so can you. But, at the same time, I think it gave me the insight so that, when I was evaluating a faculty member, I could truly understand if there is a pause in research funding because there's a certain situation in the federal government that's leading to lower funding. I will feel it as a PI, and, therefore, I think it makes me a better administrator in understanding what faculty go through.

It also provides me with a real up-and-close insight into the systems at a university. When they're not working, if they're not working for me as dean, they're not working for the faculty either. So, then I can tackle those problems, knowing that they are important problems because it's things you see, whether it's checking your grants, whether it's laboratory renovations. If I'm having a challenge with those as dean, so are all my faculty, so then I can work on fixing those.

06:20 The Year of Prestigious Awards – Bringing Research to the Personal Level

Wen:

You were elected as an ASME fellow in 2006, and, in 2013, you received a number of very prestigious awards. You received the ASM International Gold Medal Award and then the Edward Demille Campbell Memorial Lectureship. You were elected as a fellow of the Materials Research Society, and you were elected to the National Academy of Engineering (NAE), the highest honors for engineers. According to the NAE, you were elected for your contributions to novel processing of metals and alloys and for leadership in engineering education. Can you give more details about that?

Lavernia:

Ironic, isn't it, that 2013 ended up being such a special year? Really, I think there's a layer of randomness. The fact that all these awards came together in '13, no way of predicting that. Many of these awards and

nominations are done without your knowledge. So, needless to say, it was a huge surprise in many, if not all, cases. I think it was the culmination of the great work of my research group and colleagues. [I] always loved having a very intellectually rich culture with the graduate students, not just in their own research, but encouraging them to work with each other. Often, I tell the students, "You're going to learn as much from me as you are from your colleagues. So, work with them, collaborate with them. Help them when they need help because someday you will need help."
I think that turned into some very productive, interdisciplinary papers that would not have been possible if everybody was just doing their own work and not really collaborating. Creating that atmosphere in the research group also involves getting to know people personally. So, as you know, you've been to many barbecues at my house, bringing them over. That goes back to my days as a graduate student, right? I loved being able to interact with the faculty at a different, more personal level. So, I've continued to do that to this day, and that's the day I cook for everybody. It's an opportunity to get to know people, which is just so important in everything we do.

09:02 "Super Dean" – It's Always About People

Wen:

People called you "Super Dean" at UC Davis. You were the dean, a highly successful researcher, and the advisor of many graduate students. People said you were extremely nice. Your students said no matter how busy you were, you were always available to help. What do you think of the "Super Dean" title, and how did you make time for everyone?

Lavernia:

Let me just say that I've never heard of that title, by the way, and it brings to memory an interesting interaction that I had with my son (Alejandro), and he was very young—actually, both son and daughter (Laura). We had, if you remember, Picnic Day at UC Davis, which is a day where all the alumni got invited back, and about 60,000 people show at Davis campus. We decided, for the first time, to have these tents where each of the schools would have the dean meet alumni and friends. So, it was my turn to go to the tent, while I was with my family, I said, "I have to go and spend the next two hours busy at the tent." Alejandro and Laura asked, "Well, what do you mean?" [I replied] "Well, it's a tent that is called, 'Meet the Dean'." They both laughed, and they looked at me [and said] "Now, who would want to meet you?"
I say that anecdote because I think it's always sobering to listen to the perspective of young people. At the same time, I thoroughly always enjoyed people. I think that regardless of what you do, researcher, administrator, or faculty member, a rule of thumb is that I always remind my faculty, my deans— It's always about people. It's not about the rules. It's always about people. And, if you approach problems that way, it gives you a very powerful tool, and 40% of any big conflict is grounded on people. And, I always enjoy doing that, and so— not sure why they call me "Super Dean," but I've never heard that before.

11:24 Provost and the Executive Vice Chancellor for Two Years at UC Davis

Wen:

So, you were the Provost and the Executive Vice Chancellor for two years at UC Davis, as UC Davis transitioned to a new chancellor, and you mentioned that there was an interesting story to share. Can you tell us a little bit more details about that?

Lavernia:

Oh, yes. That was a very stressful part of my life at the time. So, the Provost and Executive Vice Chancellor who hired me, Virginia Hinshaw, who was fabulous, as I said, left to become the President of the University of Hawaii. Shortly before her departure, Virginia and the then Chancellor, Larry Vanderhoef, asked me to step in as Provost and Executive Vice Chancellor while they did a search. I thought about it, and what I said to them was, "You have some exceptional deans in place who can do this. I have a full research load. I'm in the middle of hiring a hundred faculty, and I have a young family at home. I would rather not do this". They decided to appoint a search committee who again approached me, and I said no. There was a third attempt to get me to accept it, and again, I said no.

We went through the search, and in the middle of interviewing candidates, I went to meet with the Chancellor. I never forget the day I walked into his office, and I said, "Okay, Larry, I'm here to tell you what I think." And, he said, "What you think about what? The candidates?" I said, "Well, yeah, is that not what we're meeting [about]?" He said, "No." I said, "Well, why are we meeting?" He said, "Because you need to do this job." It was profoundly flattering because I truly thought that my colleague from the College of Agricultural and Environmental Sciences would have made a fabulous Provost EVC. So eventually, I said, "Okay, can you give me some time? Let me talk to Julie." This was on a Wednesday, and he said, "Okay, can you tell me Friday?" So I went home, and I had a nice discussion with Julie. I said, "Look, I can't turn my back on the campus. I don't know why they really want me to do this, but I'm willing to do it. I love learning, and this is certainly going to be a learning experience."

So, I said to Larry, "Okay, I'll do it, but before I do it, you have to tell me you're not going to retire," because, at the time, he had been the longest-serving chancellor in the UC. Larry's words were, and he's passed on right now, wonderful man, "Enrique, I'm going nowhere until I know that the campus is in good hands." I said, "Okay, fair enough." So, I accepted the job. I'm driving my daughter to volleyball on a Sunday, and Larry calls, "We're ready to make the announcement to campus; let me read it to you." The announcement reads, "Professor Enrique Lavernia for an appointment as Provost EVC for up to two years."

I said, "Woah, Larry, who said, two years? I said I agreed to do this for a year." He said, "Oh, well, if we do two years, I can make what's called a Term Appointment, which means you don't carry the title interim." Beyond two years, there needs to be a search, but it's important that you don't carry the title interim because you make budget decisions. I said, "I don't know. That makes me nervous." He said, "Don't worry about it; it will be fine."

So, I accepted the job. Six months into the job, his office was next to mine, he walked into my office, and he said, "Enrique, I woke up this morning and decided that the campus is in good hands, so I'm going to retire." I just shook my head, and I said, "Clearly, you're smarter than I am because I should've seen this coming." I had asked for a letter giving me the right to return as Dean at any time, which is, in retrospect, one of the smartest things that I did. The College of Engineering was being run by then my former Associate Dean, Bruce White, who was a fabulous Dean. So, that was the transition that led to Linda Katehi arriving at Davis. Then, eventually, I decided to go back to becoming the Dean of Engineering again, and it worked out.

15:56 Returning to UC Irvine as a Provost After 13 Years – A Time of Growth and Excitement

Wen:

So, in 2015, about 13 years after you left UC Irvine, you came back to UC Irvine. You left as a Department Chair, and then you came back as a Provost and Executive Vice-Chancellor. Coming back after 13 years, how did you feel?

Lavernia:

So, I was getting ready to go on sabbatical at Davis, and Irvine called because they were looking for a Provost EVC. That was not a hard decision, because we enjoyed Irvine very much. Both Alejandro and Laura had left Davis by then. Southern California is certainly a much more interesting place to be from a cultural and geographical standpoint. So, it was easy to accept the invitation to apply; it was very easy. My interactions with then-Chancellor Gillman, who is today the Chancellor, were very easy and clearly somebody I could work with. As my daughter said to me, "Wait a second, you're giving up a year sabbatical to go do this job; that was so tough the first time? So, you're not very smart, are you?" It was a great decision for both of us to return, and it's been almost five years of just tremendous energy and excitement.

Wen:

So, as Provost UCI's Chief Academic and Operating Officer, with primary responsibility for the university's teaching and research enterprise, which includes 16 schools, nearly 5,500 faculty, and more than 190-degree programs what are the opportunities and the challenges for UC Irvine?

Lavernia:

UC Irvine is in a very exceptional time and place in its current state. We're in the process of implementing a five-year strategic growth plan that involves adding 500 new faculty in five years, becoming the campus of choice for undergrads, increasing fundraising and research expenditures, and, on all fronts, we're making this tremendous progress. Just this year, we announced that we had 120,000 applications for the freshmen class, second in the country only after UCLA, which is incredible because that growth has occurred in the last five, six years. We have broken fundraising records. We're in the midst of a $2 billion campaign and have already raised $840 million. Orange County is part of the reason why you see Irvine so successful. It's three million people; it's the sixth-largest county in the country. It's wealthy, it's diverse, and it's engaged. So, unlike some of our sister campuses that are in constant conflict with the communities they are in, Orange County loves UCI, and that makes a big difference when we want to grow, build, expand. It's not a battle; it's support.

So, it's been a lot of fun to be at UCI at this time. We are creating new and unusual programs, such as a new College of Health Sciences, that was recently endowed with $200 million to put together medicine, nursing, population health, and pharmacy in one school, to be able to train students in a different way. The campus is extremely diverse. We have more Pell-eligible students at UCI than the entire Ivy League put together. So, the experiment here is the combination of bringing in students, providing them with access, first-gen, minority students with absolute academic excellence, Nobel prize winners, national academies. And, so far, it's just a tremendous success, and I'm very proud and humbled to be part of this experiment.

20:40 Avoiding the Administrative Dark Side – Staying Productive in Research

Wen:

In addition to being the Provost, you are a Distinguished Professor of Materials Science and Engineering. You still maintain your high research productivity, and then your position as Editor in Chief of MSEA. You have published more than 600 journal papers, and then 200 conference publications and have been awarded 11 patents on topics ranging from nanomaterials to aluminum alloys. Now, you are a “Super Provost.” How do you find time to do all of these?

Lavernia:

Oh, there's no secret. Haiming, it's perhaps part of my hyper personality. I like to get up extremely early, as you probably know from my email hours. But, again, surround yourself with really smart people, let them do their job, encourage them. Again, as an academic, continuing to be productive gives me a great platform to get the faculty to listen because they don't see me as just an administrator. In the academic world, they say that once you become an administrator, you go over to the dark side. So, I've been trying not to go over to the dark side.

As Dean, I've been able to work on issues of space, new buildings, because I know as a faculty member that we need to do that. So, it's been tremendously enjoyable. In the last four and a half years, we have hired 13 new deans, six vice-chancellors, a campus council, a chief of police, and a new director for a museum that we're starting. It's just not the numbers; it's the fact that, in every case, we've hired our top candidate. I think the reason is people see the environment, the work environment, and the energy of the campus, and they want to join, and it's just been terrific.

22:54 Acta Materialia Gold Medal – My Research from the Beginning Until Today

Wen:

Your most recent awards include the 2020 Acta Materialia Gold Medal Award and the election to Chinese Academy of Engineering as a foreign member. You will receive the Acta Materialia Gold Medal and present an overview of your research, in two days, at the TMS annual meeting. What specific topics will you talk about?

Lavernia:

I must tell you how humbled, flattered, and surprised I was; Acta has always been the gold standard. It's what I'd like MSEA to turn into; but it's also been the place where we send papers, and you get very critical reviewers. It's been just tremendously positive in my life when I learned about this award. So, [what] I'm going to try to do, is put my career, from the beginning 'til today, in perspective via the topics that I have published in Acta over the years. Starting with non-equilibrium processing, talking about nanostructured materials, followed by hierarchical structures, and ending with additive manufacturing, which is what we've been working on. I have 20 minutes to do it, so it's been a tremendous challenge. But again, the credit is due to my amazing past and current students, colleagues and mentors; sitting with me looking at papers and their amazing work of putting the slides together, is the reason why I'm able to give it.

24:45 International Awards – "The Real Beauty of Research and How It Brings Together Different Cultures"

Wen:

In addition to the awards we talked about, you also received a number of other awards. In 2019, you were awarded an Honorary Doctorate of Science in Technology from Aalto University in Helsinki, Finland. In 2018, you received the Distinguished Engineering Educator Award by the National Engineers' Council. In 2016, you received Alexander von Humboldt Foundation Research Award, as well as the TMS Leadership Award from the TMS society. In 2015, you were inducted into the Hispanic Hall of Fame by the great minds in STEM. You also received the Hispanic Engineer National Achievement Award and the Society for the Advancement of Chicanos and Native Americans in Science Distinguished Scientist Award in 2011. So, you received a lot of international awards. Can you give a little bit more details on that?

Lavernia:

So, Haiming, I think that goes back to the real beauty of research and how it brings together different cultures, people from very different backgrounds, all working on the same platform of research issues. I think these awards just reflect my passion and good fortune in engaging with international collaborators in in-depth ways. My sabbatical in 1997, in the Max Planck, led to research relationships that continue even today. Professor Horst Hahn is, in fact, a distinguished visiting professor at UCI. It was my research with him that led to the Humboldt Senior Research Award. Similarly, I started a collaboration from my days at MIT, actually, with Finland, that continued over the years. I ended up on an external advisory board of scholars that worked on what was then the Establishment of Aalto, which was formed from three different universities in Finland. I continued that collaboration, and I was very surprised and very honored by that honorary doctorate because I've watched them do exceedingly well under the new construct of Aalto University.

Unfortunately, I actually lost my very good friend and colleague to a heart condition, [Dr. Mauri Veistinen], with whom I have a number of patents and papers that passed away very suddenly a few years back. But, the collaborations continue. I think similarly, with the awards related to Hispanic students, Hispanic faculty, diversity is a really important component of the success of any academic program, something we take very seriously because of my birth as Cuban, and I speak Spanish fluently. I've leveraged that to be able to address young students and faculty and help them be exposed to the opportunities of higher education that this country offers that are truly transformative in terms of their lives and opportunities. It's always cute when I show up to these meetings, and I talk to them in Spanish because that's the last thing they expect. But I think it sends a message that, if I can be standing here, so can you, and I think that's a powerful message that we all need to continue to pursue.

My relationship with former students, colleagues, collaborators in China has continued from the very early years. Some of my first PhD students were Chinese, and I've been visiting China since, my goodness, the early 90's. It's been amazing to watch that country transform itself by investing in education and infrastructure. Despite some of the current challenges that we have, I think that it's a remarkably rich culture with a passion for learning. So, I was very honored when I was notified just this year, as you know, of that election to the National Academy of Engineering of China. The induction ceremony is supposed to take place in May or June, but I don't think that's going to be the case. I am just hoping that this current health crisis passes quickly and everyone ends up doing well.

30:31 Society Membership Since 1982 – A Support Network for Research, Education, and Industry

Wen:

So, you are a member of AIMEs Member Society, TMS, as well as a member of ASM, ASME, and MRS. In fact, you are a fellow of all these societies. When did you first hear about AIME and TMS? How did your involvement progress over the years?

Lavernia:

So, TMS is the society that I've belonged to for the longest. I think I'm a member since 1982, if the records serve me right, and that's when I started as a graduate student. As a graduate student at MIT, these societies are very active. It's really important for students to get engaged. Over the last 33 years, it's been a privilege to be able to be affiliated with societies like TMS. Providing a platform for professional networks, for learning, for staying in touch with former students, providing an international platform where people from all over the world converged to talk about important research issues. So, I can't stress enough how important it is for students now, even as early as their undergraduate years, to become engaged in these

societies. I think the programmatic richness has increased many fold since I was a student and the resources that are available to them are very powerful.

Wen:

So, how has membership benefited you in your career? How do you see societies benefiting people in the field of material science and engineering today?

Lavernia:

So, as I've just mentioned, the creation of networks of education, support, teaching, research, together with industry, is a very important component of anybody doing research today. Whether in academia or in industry or in national labs, I think it's benefited me tremendously. If I look at how much of my research has been touched by these professional societies, whether providing opportunities to meet with other researchers, taking advantage of the many tools that they offer, and providing support to our graduate and undergraduate students in terms of job opportunities, connections with other communities, and international engagement. So, I look forward to watching how the influence of these professional societies continues to grow as the new generation, hopefully, takes advantage of them.

Wen:

You have advised about 45 PhD students and about 35 Master's students. Your graduate students learned a lot from you. What advice do you have for other graduate students ~~in the field~~ for them to be successful in the field of material science and engineering?

Lavernia:

Well, hopefully, I think that some of the habits, practices, and philosophies that they learn while in graduate school, to always keep an open mind. Work well with your peers. Take advantage of opportunities that are presented to you, and never be shy to fail. A paper rejected, a proposal rejected, hey, it's painful; but, it's an opportunity to learn, if you look at it that way. I think that it's a very powerful piece of advice to always remember that it's about people. You need to tackle the problems that are in front of you, understanding where people are coming from and their position, and keeping an open mind. If you can take your ego and put it in the drawer, and approach a problem without it getting in the way, I can guarantee you that the outcome will be better.

35:10 Golden Era for Materials Science and Engineering – An Interdisciplinary Perspective

Wen:

In your opinion, what can we do to attract young people to the field of material science and engineering?

Lavernia:

Well, I think first and foremost, we need to continue to educate young students that the opportunities that are available in the field are almost infinite. I think it's a mistake, and you know this because we had this conversation when you were a student, as I'm sure, I tell all my PhD students, don't expect or try to get a job in exactly the same area as your research topic. A PhD thesis is essentially a document that states that you can think independently, that you can tackle a difficult problem independently, and that you can accomplish a certain set of goals in three, four, five years. The same thing applies to all students at all ages.

They need to recognize the opportunities that exist in the field that are very broad. So, as they go through school, increasing the toolbox of experiences, of techniques, of topics that they're familiar with will only increase the opportunities that they have.

I think that this is a golden era for material science and engineering because, if you look around every field, every important technical issue that's out there, it's touched one way or another by material science and engineering. Making sure people understand that is important. We are at a disadvantage, and societies are working on this because material science and engineering is not a topic that high school students are familiar with. High school students are familiar with mechanical engineering, architecture, medicine, law. It is not a career that they choose coming into university, so we need to do everything we can to make sure that they, as early as possible high school, middle school, even elementary school kids are exposed to these concepts.

Quite frankly, the beauty of the field, unlike any other engineering field that I know, is its unique ability to combine elements of physics, elements of chemistry, elements of mechanical engineering in the same field and tackling an interesting problem as opposed to looking at these problems from a purely mechanical engineering perspective or a purely chemical engineering perspective. The material scientist is really allowed to use tools from all these fields to tackle a problem, and I just think that's fascinating.

Wen:

Is there anything else you would like to add?

Lavernia:

So I do, I will end with there is a book that I first read as dean and that I now distribute to every dean, vice-chancellor, or even senior faculty that we hire. It was written by Steven Sample, the former president of USC. It's called a Contrarian's Guide to Leadership, and that's one of my favorite books that talks about a very different way to think and pursue leadership, that I happen to believe is quite accurate. So, I recommend it.

39:09 Advice to Students – "Let Your Passion for Learning Drive You"

Wen:

Finally, to wrap up, please tell us what has been your favorite part of working in the field of material science and engineering? Also, what advice do you have for today's young leaders in the materials profession?

Lavernia:

The greatest pleasure continues to be the communities that I interact with: the students, the faculty, the staff from all over the world. Their approach, probably influenced by the interdisciplinary nature of material science and engineering, tends to be very interdisciplinary. I think that helps establish a field that is very attractive. My advice is to students, continue to explore, continue to learn. This is a unique time in your life, and I know you probably hear this many times over, but it really is. To study things that interest you and let your passion for learning drive you and surround yourself with people who contribute to the richness of your life rather than detract from it.

Wen:

What a fascinating career you have had, and what a pleasure to spend this time with you! Thank you so much, Dr. Lavernia, for your willingness to share your story with AIME.

Lavernia:

Thank you. Pleasure has been mine.