



AMERICAN INSTITUTE OF MINING,
METALLURGICAL, AND PETROLEUM ENGINEERS

ORAL HISTORY PROGRAM

Fernando Samaniego-Verduzco's Impact on Industry in Mexico and Beyond: New Opportunities
and Hope for the Future

PREFACE

The following oral history is the result of recorded interviews with Dr. Fernando Samaniego-V. conducted by Stacie Hughes on December 20th, 2022. This interview is part of the AIME Oral History Program.

ABSTRACT

Growing up in a small town in Mexico, Dr. Fernando Samaniego-Verduzco was always inspired to go into engineering by his peers. After receiving one of only 12 scholarships offered by the Mexican Petroleum Institute, he became part of the first generation of students in Mexico to earn his master's degree. He then earned his doctorate at Stanford. After graduation, Samaniego-V. began a rewarding career as a part-time professor, researcher, and professional and was able to create a strong connection with his students by being a faculty sponsor of the UNAM student chapter of the Society of Petroleum Engineers. Besides inspiring the next generation, Samaniego-V. has also spent time leading geothermal reservoirs research for the Mexican Petroleum Institute and the Electric Research Institute before he moved to Pemex. His dedication to bringing recognition to Mexican petroleum engineering during a time when the field was dominated by the US and UK, and his devotion to helping young engineers, resonates through his work with UNAM's Petrobowl team. In 2015, after 5 years of competing, he finally led his team to victory and earned the MVP title for UNAM twice. Throughout his decades-long career, Samaniego-V. has gained recognition for his work by receiving the National Award of Science and Arts in Technology and Design, as well as the Lester C. Uren Award, SPE Honorary 2005 member, and a 2005 National Academy of Engineering foreign member. Despite the energy transition occurring in the industry now, Samaniego-Verduzco sees a bright future ahead for young engineers. Hear about his infectious optimism for the future in his oral history.

Readers are asked to bear in mind that they are reading a transcript of the spoken word rather than written prose. The narrator has reviewed, edited, and approved the following transcript.

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00:14 Introduction

Hughes:

This is Stacie Hughes from the Society of Petroleum Engineers Journals Program. We're talking over Zoom on Tuesday, December 20th, 2022, with Dr. Fernando Samaniego V., Professor Emeritus of Petroleum Engineering at UNAM [Universidad Nacional Autonoma de Mexico], an AIME Honorary and NAE Foreign member. Dr. Samaniego has long been an active participant in our Journal's peer review program, and we've known each other for nearly two decades. This recording is part of AIME's oral history capture program.

It's a delight to see you, Dr. Samaniego, and I'm looking forward to spending some time with you today. So, let's start with a part of your history I don't know. Tell me about where you grew up.

Samaniego-V:

Yes, thank you, Stacie, for the nice presentation on me. I was born in the north of Mexico. It's a town in the border state with the US. The state is Coahuila, and the small town is Lamadrid. So, I studied elementary school in that small town, and then I had to go to a nearby city for secondary school. Next, I changed again to another city for high school, and later, I came to UNAM, where I studied petroleum engineering and also the Master of Sciences. And finally, later, I went to the US to study for my Ph.D. at Stanford U.

02:03 Why I Chose Petroleum Engineering

Hughes:

Who or what influenced you to become an engineer?

Samaniego-V:

Well, actually, I was just talking to my classmates at high school that were advanced one year, and they have started their studies at UNAM in petroleum engineering. I was kind of impressed somehow because one of the important areas that, at the time, I did not quite recognize was reservoir engineering; then you are dealing with a system that is underneath a few kilometers, so you don't get to see this main system, which you need to work with. And that was kind of challenging.

Hughes:

That's interesting.

Samaniego-V:

Stacie. Yes.

Hughes:

Well, at the time you began studying engineering, there were not a lot of petroleum engineering

programs outside the US. What led you to choose petroleum engineering over other engineering options?

Samaniego-V:

In the early sixties, the National Pemex Company was highly regarded by the Mexican population and engineers — I mean, it was kind of respected. Not as military personnel, but that caught my eye, and I decided to study petroleum engineering.

Hughes:

Did any of your professors mentor you toward the path you chose?

Samaniego-V:

Not at the time for the BS, Stacie. To the best of my recollection, they were not aware of these studies. But anyway, I have no doubt I made the right choice. As we all know, we need to work on what we enjoy, so the duties to be carried out hopefully will be, let's say, completed in the optimum best way.

Hughes:

Well, how about classmates? Were there any of your classmates that influenced your studies? Is there anyone in particular?

Samaniego-V:

No, just what I mentioned: classmates at high school who were advanced one year. At the time, high school was for us two years. I was in the second year, but they were already graduated from high school and started their studies in Mexico City. I was studying high school also in the north of Mexico.

05:57 Leaving My Life in a Small Mexican Town for the US

Hughes:

Oh, wonderful. Dr. Samaniego, tell us about your family.

Samaniego-V:

Well, my original family, we call it in Mexico, we were two sons and one sister. We had a simple life, I told you that before, in a small town. Then I got married, and we had two daughters and one son.

Hughes:

Oh, wonderful.

Samaniego-V:

I'm living in Mexico City. And that's perhaps just a brief description of my two families. The first and the

married family.

Hughes:

Yeah, yes.

Samaniego-V:

Yes, Stacie.

Hughes:

You came to the US in the early seventies for your doctorate at Stanford. What inspired you to come to the US at that time?

Samaniego-V:

Well, at the end of my BS studies, we made a three-week industry trip to the states of Texas, Oklahoma, and Louisiana.

Hughes:

Mm-hmm.

Samaniego-V:

We really enjoyed that fantastic opportunity to get to see or to know more about the States, and that was the beginning of my definite effort to go to the US to study. At the time, there were no MS studies in Mexico, I mean, no graduate studies.

Hughes:

Oh wow.

Samaniego-V:

But I was lucky that just about that time, the IMP (Mexican Petroleum Institute) offered 12 scholarships, and then I was lucky to get one of those for the first generation of MS petroleum engineering studies.

Hughes:

Oh, wonderful.

Samaniego-V:

That opened once again my way to the US because we had a young professor coming from Venezuela, Dr. Sandra, that studied at Penn State. And I talked to him in the summer of 1970 about my idea of continuing to study, and he fully agreed with that and asked me to send my applications to the

University of Texas at Austin and Stanford U.

Hughes:

Wonderful.

Samaniego-V:

I got admission to both of them at the end of 1970, and following his recommendations, I took the admission to Stanford.

Hughes:

What was that transition like for you? Was it a bit of a culture shock when you made that move to the United States?

Samaniego-V:

Well, no, not quite, Stacie. As I told you before, I was born in a border state, so I was used to going to a small border town called Eagle Pass, Texas.

Hughes:

Yes.

Samaniego-V:

And that was part of the motivation, coming from a small town and going to Eagle Pass, even if it was a small city. It was a big change.

Hughes:

Yeah. Oh, I can imagine.

10:31 Facing Challenges as a New MS Student and Changing My Approach

Samaniego-V:

No, no, I had no problem, Stacie. My problem is that I studied in very good public schools but with few English courses. So, I was admitted to the two universities I just mentioned in the States — but when I took my TOEFL [Test of English as a Foreign Language] exam, the news was not good. I was in a rush to improve my English, but the remaining time was not enough. Then they requested me to go to an intensive summer course for ten weeks.

Hughes:

Mm-hmm.

Samaniego-V:

Yes. I enjoy that. I got a distinction in the course.

Hughes:

I bet that was difficult.

Samaniego-V:

I remember. I started in the fall of 1971 — but still, I got tired after my third class in the morning. I had four in a row, I remember. I had trouble keeping alert to concentrate in the fourth class. In my first quarter, my grades were okay, but I had to think of improving my academic work. My approach was simple: to consider the first day of January '72, I mean, as if it were the first day of finals. So, then my grades by that second quarter were good, and they were kept high for the six quarters that I had to take courses before the qualifying exams.

Hughes:

Oh, that's impressive.

Samaniego-V:

Yes.

13:00 My Motivation and Influence as a Professor – One Student's Legacy

Hughes:

That's wonderful. Well, what did you find most rewarding about being a professor?

Samaniego-V:

Well, you see, being in touch with young people, somehow, they motivate you. They are eager to learn.

Hughes:

Yes.

Samaniego-V:

And see how useful the professor could be. For example, for the last 12 years, I have been the faculty sponsor of the UNAM student chapter, SPE [Society of Petroleum Engineers]. And that gives me close touch with bright students.

Hughes:

Exactly. It's a great opportunity.

Samaniego-V:

A high standard is needed for the PetroBowl competition.

Hughes:

Well. I looked at your CV, which includes an impressive list of students you've trained who have gone on to outstanding academic or professional careers. One name that stood out to me was Dr. Edgar Rangel-German.

Samaniego-V:

Yes.

Hughes:

Who helped establish the National Hydrocarbons Commission and who died suddenly in early 2016. Can you tell us a bit about your collaboration with him?

Samaniego-V:

Oh, yes, yes. Edgar was part of a small special group at the School of Engineering. They call it the High-Performance Students, students with an average grade higher than nine; I mean in a range close to 10. And he was about to start his seventh semester at UNAM. The Petroleum Engineering BS is in ten semesters. And it could be 11 for the development and writing of the BS report.

Hughes:

Yes.

Samaniego-V:

Edgar, of course, was very different. He's the only student in the history of petroleum engineering at UNAM that has been able to keep a 100-clean average in almost 100 years of the BS studies in petroleum engineering at UNAM.

Hughes:

Wow. That's remarkable.

Samaniego-V:

His report, just to mention — I mean BS report before going to Stanford again for MS and Ph.D. — was published in the Journal of Petroleum Science & Engineering. He was excited to go to present a paper at the 1995 World Energy Congress held in Tokyo.

Hughes:

That's remarkable.

Samaniego-V:

Of course, we always had a very close relationship.

Hughes:

Yeah.

Samaniego-V:

Yes, but it's unfortunate that he died young.

Hughes:

Yes, it's a huge tragedy.

16:41 Why Geothermal Reservoir Engineering?

Hughes:

You haven't only been an educator. You have spent part of your career leading important research for the Mexican Petroleum Institute and the Electric Research Institute and worked in Pemex. You've conducted several research projects on geothermal reservoirs. Now that there is more focus on geothermal resources, I suspect that your work is getting more attention now. So, what led you to conduct research on geothermal when you did? And how will it help in developing these resources today?

Samaniego-V:

Oh yes, Stacie. I was lucky. I was a student of Dr. Ramey at Stanford, and he was one of the pioneers in geothermal reservoir engineering. Actually, I took his first course in geothermal reservoir engineering back in '74. I was always close to him, but my main advisor was Dr. Bill Brigham, also a pioneer in geothermal reservoir engineering. I always had an improving good relationship with both of them until they passed away. Yes.

Hughes:

Oh goodness.

Samaniego-V:

That was my motivation. I was offered this job at the Electric Research Institute, and I started the geothermal reservoir engineering program. I left the institute because I got two job offers from Pemex. I will talk to you about this part of my career in a moment.

18:41 Career Advancements and Big Changes at UNAM – Establishing a New Doctoral Program

Hughes:

Okay. Well, then, what are some of the biggest technical challenges you have experienced during your career?

Samaniego-V:

Yes. I spent just about three years working at the Pemex offices, and they asked me for a different duty to take care of. But I enjoy very much working with the gas fields in the north of Mexico and also with the super-giant Akal oil field, which later was called Cantarell. Many exciting performance behaviors arose; they were very useful for me to work with.

Hughes:

Well, with the support of Pemex, you helped to establish the doctoral program in petroleum engineering at UNAM. Can you tell us a bit about that experience and why you thought that it was important?

Samaniego-V:

Oh, yes. At the time I talked to you about it— there were no Ph.D. studies in Mexico. In the middle of 1979, there were four of us with Ph.D. degrees, all in the US. I mean that we have gone to schools in the US. Two of them were actually working in the US at that time, and the remaining two, one was at CFE, Federal Electricity Commission, working in geothermal reservoir engineering, and myself at the Electric Research Institute. Then Pemex devised a plan to offer good job conditions for us to come back to the oil industry, and we all accepted.

Hughes:

Oh, wonderful.

Samaniego-V:

During my first years at Pemex, I was traveling and teaching. I was young; I still worked long hours, but at the time, the day journey was longer.

Hughes:

Well, because of your UNAMs agreement with Pemex, your graduate students are able to help solve real-field problems as part of their research. Can you tell us a bit about what that partnership has meant to you and to your students?

Samaniego-V:

Well, yes. It is difficult sometimes to get information about the oil fields. But somehow, the engineers trust us, and we, of course, will not do bad use of the data. And it is a benefit for the company and the students. It is kind of a deal that everybody gets something to improve. We develop thesis reports

regarding problems that were important for the company. We have done that, let's say, at least from '79 up to date.

23:01 Leading My Team to the Top – Being the First Foreign University to Win the PetroBowl

Hughes:

Oh, goodness. It's impressive. Well, you've been very successful in developing UNAM's PetroBowl team, becoming the first non-US university to win the competition. Congratulations. Tell us a bit about how team members are selected, how you inspire them, and what winning or placing well has meant to your student's education.

Samaniego-V:

Yes, Stacie, thank you. That's one of my favorite topics.

Hughes:

It is exciting.

Samaniego-V:

The PetroBowl, as perhaps you know, started in 2002. It was sponsored at that time by the SPE Gulf Coast Region, and it was exclusive to US universities up to 2009. But in 2010, they opened the competition for foreign universities, and we went to the nice city of Florence. It was the first time that SPE went abroad for the ATCE [Annual Technical Conference and Exhibition].

Hughes:

It's a great opportunity.

Samaniego-V:

We prepared in a short time, about three months, but nevertheless, I believe we had the highest 2010 score in the first round. But for the second, we had trouble with the English, and we lost the second round.

Hughes:

Oh, it's still a huge accomplishment.

Samaniego-V:

Yes. We got the ninth position, at that time, out of 32.

Hughes:

That's fantastic.

Samaniego-V:

And then we went in 2011, we were fifth, and in 2012, second.

Hughes:

That's fantastic; huge track record.

Samaniego-V:

Yes. We had to wait until 2015, when we got the first PetroBowl, but we also got the MVP. SPE has been awarded in 21 competitions up to today (2022), only six MVPs. UNAM has the 2012, and we also got the MVP in 2015. So, we have gotten two; we are the only university that has two. The other four are in US universities.

Hughes:

That's a wonderful track record and a huge accomplishment.

Samaniego-V:

And last, at the [2018 ATCE in] Dallas, we reached first place in the competition. In nine competitions [out of 17], we got to the top, and we stayed until January 2021.

Hughes:

Oh, That's really exciting and a huge accomplishment.

Samaniego-V:

We're happy to be at the top. The only university, a foreign university that has held that position. That's the long story.

Regarding the PetroBowl team, we have, at this moment, three companies that are our supporters, even though we have not had the best results recently. That relationship is good for us. I mean, it's needed a connection with the industry.

27:28 Raising Industry Standards and Changing the Face of Petroleum Engineering in Mexico

Hughes:

It's exciting, though. Well, how do you view your role in terms of helping to build the pipeline of qualified future employees for our industry?

Samaniego-V:

Well, we at the university always aim for higher standards. We would like our students to have the best

possible education. By that, I mean that the level of the studies is comparable to the US and European petroleum engineering departments. It's difficult, but if we dedicate the effort, it could be possible. And that's what we, in simple words, do. We try to hire the best professors, and we have a lot of consulting professors that come from the industry to teach on Saturdays, early mornings, and evenings, that helps us a lot.

Hughes:

It's really important. Okay. What is your proudest professional accomplishment?

Samaniego-V:

Well, Stacie, I believe one main point is that I mean, I had for the first time in my mind the idea of studying for a Ph.D. Because, at the time, there were no professionals with these higher studies in Mexico. And the road was not easy to go through, but in the end, everything came out okay. That, I believe, is my biggest professional, let's say, change or improvement, to open these studies for the engineers in Mexico. We do not have that many, but I don't know, maybe 50 or so at the time. This, of course, has improved the way we solve the problems in the industry.

Hughes:

That's fantastic.

Clip 3

30:40 National Recognition and a Meeting with the Mexican President

Hughes:

In 2005, you were named a foreign member of the National Academy of Engineering in the US, also a high honor. How did you come to receive this honor?

Samaniego-V:

Well, you know better than me how it works in the US when somebody picks your name for an award. They just ask for your CV, and that's all. Mr. Michael Prats, who is my friend, asked me in the early 2000 years for my resume.

Hughes:

Yes.

Samaniego-V:

Earlier in '94, Mr. Michael Prats asked me for the first time for my resume. I met him in 1990 when he came to the Mexican National Petroleum Engineering meeting; it was just by chance that I met him. So anyway, his wife, my wife, and Fernando, our son at the time three years old, and we went to this annual meeting in a nearby nice city, Queretaro, Mexico, and then after, we kept close.

Hughes:

Huge accomplishment.

Samaniego-V:

Very helpful to me anyway; kind of mentor. He's 20 years older than me and still going on.

Hughes:

It's a huge achievement.

Samaniego-V:

Yeah.

Hughes:

Well then, in 2006, you were awarded the National Award of Science and Arts in Technology and Design, which is the highest distinction awarded by the Mexican Federal Government, which is a great honor. Can you tell us a bit about how that came about?

Samaniego-V:

Well, yes. These awards have one for technology, another for what we call mathematics and physics, and then four for arts.

Hughes:

Oh, fantastic.

Samaniego-V:

A total of six; well, the award committee, like I believe any other, spends time and decides in a careful way who is going to be awarded this prize; it was a very nice experience to meet the president of Mexico at the time.

Hughes:

That's exciting.

Samaniego-V:

It was a good and enjoyable occasion to travel first to Washington, DC, to receive the foreign membership to the National Academy of Engineering (NAE) on the 9th of October, and then travel to Dallas to the ATCE starting that Sunday afternoon.

Hughes:

That's perfect.

Samaniego-V:

In other words, after the induction ceremony in Washington, we went to Dallas for the Honorary Membership award the next day, Monday, the 10th of October, 2005.

34:53 I Did Not Work for the Awards, They Just Came – A Culmination of a Decades-Long Career

Hughes:

That's really exciting. Well, you've always been active in SPE, and you've chaired the Mexico section and held both distinguished member and honorary member status. You were awarded one of SPE's highest technical honors, the Lester C. Uren Award, for technology contributions made before the age of 45. Tell us what it was like to receive this recognition.

Samaniego-V:

Yes, I enjoy it very much. It was at the beginning of 2004 that I got the news from SPE about this important award, but I want to tell you a short story. I worked for at least 20 or more years with no expectation, Stacie, of winning awards. I went to the ATCE every year starting in '75, but I also went to the '73 while being a student; I have worked as best as I could.

But all of a sudden, Mr. Prats and perhaps some other SPE members started to look at my CV, and I got these two highest awards, the Honorary Member and the National Academy membership. But as I told you, I did not work for the awards. That's what I'm trying to say; they just came—

Hughes:

They just came.

Samaniego-V:

All of a sudden. Something like that, Stacie.

37:30 My Dedication to Peer Review and Its Indispensable Value

Hughes:

That's even more exciting that it came unexpectedly and you weren't planning for it, so that's really exciting. Well, you've been a longtime peer reviewer for SPE's journals and have an impressive list of publications of your own. While publishing is always important for professors, your level of dedication to peer review has been notable. What do you see as the real value of peer review?

Samaniego-V:

I'd like to tell you that my first SPE committee was the Editorial Review Committee back in 1983. Dr. Rajagopal Raghavan was kind enough to ask me to be a member of the Committee. He was an Editor. So, I started my SPE duties, and then a bunch of committees came afterward.

Hughes:

That's impressive.

Samaniego-V:

Yes, I enjoyed all of them. As we know, peer review gives us, as a result, papers that the readers trust. I mean, because the paper meetings are just selected based on the abstract, but for the published papers, two, perhaps three, reviewers carefully spend hours to check every aspect of the manuscript, and then the reader is sure that whatever, just about, is written, is right and then can apply that to improve the way they work. I believe that's the main value of peer review.

Hughes:

Support it. It's a big part of it.

Samaniego-V:

Stacie, to have papers that people can trust.

40:03 SPE – Our Best Source of Technical Information

Hughes:

Well, if you were to recommend SPE to a new graduate, what would you tell him or her about being a member?

Samaniego-V:

SPE is the most important society for petroleum engineers; I encourage always the students to be student members. That is the first step. And thanks to our sponsors, it's free for them. Being an SPE Member, you are on your way to excelling in your profession.

Hughes:

Oh, that is fantastic.

Samaniego-V:

Our best source of technical information, of course, is the SPE. Now it is kept in the system OnePetro, which is a big collection of hundreds of thousands of papers. Whenever I can, I asked the students and the professionals to join the SPE; I believe we can lead, somehow, by example, Stacie. I have been a member since 1972 myself.

Hughes:

That's wonderful.

Samaniego-V:

What we do may be taken into account by some other people and join SPE.

42:08 The Energy Transition and My Advice for Young Engineers

Hughes:

That's fantastic. In your opinion, what can we do to attract young people to the industry?

Samaniego-V:

I can advise people to come to work for the industry because up to this time has been the main energy provider and is expected to keep this important role for the next few decades of the so-called energy transition. The energy transition, of course, is okay, it's no problem, but the oil industry will remain important, and no people, young students, should not have to worry much about what they will do. In the end, they have the knowledge to work in related areas like geothermal energy we talked about this morning, and also hydrogeology; water will always be important.

Hughes:

It's very important.

Samaniego-V:

Yes.

Hughes:

Well, what has made working in oil and gas meaningful to you? Is there anything specific that is more meaningful to you?

Samaniego-V:

I really have enjoyed working in the industry. And something that has been also useful for me is that I had both the industry and the academic approaches, and then I could, in the past and in the present, help or take the best from one to the other and vice versa. That's my own view, Stacie.

Hughes:

What advice would you have for today's young leaders in the engineering profession?

Samaniego-V:

Keep close to our Society, the SPE, and of course, to AIME. I always have in mind, of course, the AIME. At the time of the Honorary Membership, the first news that I got from it was a letter from the AIME; we are not used to letters these days. It would be a nice way of networking and improving whatever duties you have to work within the industry or in the universities. In the universities, due to limited resources, we need to have a close connection to the industry.

Hughes:

It's important.

46:13 The Future of Our Industry is Bright – Closing Thoughts

Hughes:

Well, as we wrap up our interview today, is there anything else you would like to share with us that comes to mind in closing?

Samaniego-V:

I want to state, Stacie, that the future of our industry is bright. We should not be afraid of the energy transition. It's a needed change and a change that we will share with the new energy sources. Recently, we had news from the US government (12-2022) about the big advancement of nuclear energy, and more good news regarding energy sources will come, and our industry will survive for a few decades anyway. I don't know how long, but at least 30 or more years. That's what all the experts have been telling us about.

Yes, I already talked about it; the knowledge of petroleum engineers is strong, well-rooted in physics and math, and then they can also work in other areas. Youngsters: come to the industry, come to the schools. The number of 400 graduates that I read in recent weeks in the US is low, but I hope that soon it will increase in accordance with the needs of the industry.

Hughes:

Well, I love your positive outlook. I think that's quite impressive, and what an exciting life and career you've had, Dr. Samaniego. This has been a true delight, and I'd like to thank you for sharing your story with us today, with AIME, and happy holidays (12-2022) to you and your family.

Samaniego-V:

Yes, I want to thank you, AIME, SPE, Stacie, Glenda, and Michele, for picking my name for this interview. It was long due for 2019 when we went to Calgary. Okay. Thank you all.

Hughes:

Thank you. It's been wonderful to talk to you.