

# Transcript Fireside Charla 003: Jordan Evans

**Perette:** *Fireside Charla* starts now!

**Adela:** I'm really excited about today's Charla. So let's just go around the room today and introduce ourselves.

**Jordan:** I'm Jordan Evans. I'm a proud Aztec alumni and I am the Deputy Director for engineering and science at NASA's Jet Propulsion Laboratory in Pasadena, California.

**Michelle:** I'm Michelle LaGrandeur. I'm the Director of University Initiatives for the Los Angeles area and I'm an Aztec for life.

**Laura:** My name is Laura Wade. I'm a senior here at SDSU, studying mechanical engineering and I'm finishing up this December.

**Adela:** Well, I'm so excited to be here with so many wonderful Aztecs. But I want to start with you, Jordan, and ask you to share with our audience what you do and what you did at San Diego State University.

**Jordan:** Sure, yeah. So what I do in my current job, I am responsible for leading the engineers and scientists of the Jet Propulsion Laboratory and we're tasked with robotic exploration of deep space. So, getting outside of Earth orbit, getting beyond the moon. JPL's job is to robotically explore in the name of science, the rest of the universe. And so I help lead the teams, help design the new missions. And just make sure that on our path to scientific exploration, we will hit our bumps in the road, but we get past them, we learn from them. And then we explore in the name of science.

**Adela:** So Jordan, I remember reading that you love jazz. And in fact, when you started at San Diego State, you didn't want to go into engineering, you really wanted to be in jazz. Can you give me a little background about that?

**Jordan:** Sure. That is true. Starting about age eight, I wanted to be an aerospace engineer. We had landed the Viking Landers on Mars and I remember seeing some pictures in the encyclopedias back then of snow essentially falling on the surface of Mars that had persisted about 100 Martian days, or sols, on the surface. And that hooked me, this is what I want to do. I want to explore the planets. And then in high school I got really into music.

So had to make a decision. I ended up applying to both engineering school and music school, got accepted into both. And I chose San Diego State because not only did it have aerospace engineering, but it had an outstanding Jazz Studies program and figured it was easier to be an engineer that did jazz on the side than a jazz musician that did aerospace engineering on the side.

**Adela:** I have to tell you, when I graduated from Berkeley, I thought about being a jazz pianist. But I realized that was harder than teaching economics so I can understand those choices as well.

So Laura, you're a student right now in mechanical engineering. Can you tell us a little bit about your path towards mechanical engineering?

**Laura:** Yeah, so I originally wanted to be an aerospace engineer when I was a kid. So when I went to community college, I struggled between aerospace and mechanical. I did learn that they are very similar and I was urged to go forward with mechanical engineering. I heard it was easier to work as an aerospace engineer with a mechanical engineering degree versus the opposite. So I went into mechanical, I joined the SDSU Rocket Project. And I feel like it's been a great decision to go forward with mechanical.

**Adela:** So one of the things that is pretty exciting about SDSU and particularly the deep Aztec connection is how we help each other. So Jordan, I wanted you to just tell everyone how you've been helping Aztecs so they can get excited about engineering and go into space like you did.

**Jordan:** Sure. So currently, as a professional, I try to give back to the university by participating in the Aztec Mentoring Program and I've been doing it since the program started. And every semester, I know we run short on the number of mentors. So I'll mentor one or two students a semester and have an opportunity to be inspired by them, hopefully inspire them along the way. Help them see just how fascinating the world of engineering is, how creative the world of engineering is, how much fulfillment you can get in engineering, the fact that the people side of engineering is so important and you will always work on teams and learning to really focus and respect that and value that.

The interactions end up, by the time a student starts a semester till the end of the semester, the feedback I get is that they've grown as a person. And the feedback that I give them is that I have as well. I mean, they've opened my eyes to not only energizing

me to, you know, the field that I have chosen, but also allowing me to see the creativity that is so widespread in the university.

**Adela:** So you've mentioned the word mentoring and mentors. So Laura, from your perspective, have you had some key mentors?

**Laura:** Um, Jordan is my first mentor, besides the mentors I had at work the previous year and a half, but this is my first mentor for Aztec Mentor Program.

**Adela:** And so what's Jordan done for you in terms of really opening your eyes about your future career?

**Laura:** Jordan has given me insight to his path to where he's gotten today and I think that really helps me and understanding it's okay to have multiple passions and to just move forward and figure out what you really belong in.

**Adela:** So one of the things that we'd like to turn to is really, what does it mean about being an explorer? And I'm sure you've been exploring many things, Jordan, based on your experience in your field. Can you give us a little bit of background on the innovation and explorations you've done in space?

**Jordan:** Sure. Yeah. So I mean, that is absolutely why I went into aerospace engineering and wanted to go work for NASA, to be able to be a modern-day explorer, and the fact that exploration is something that is just so human, we, you know, we want to do it, we want to pursue it. And so to be able to, to go to work each day and whether I'm working on a mission to go to Mars, or we're looking at a way to measure and see planets around other stars outside of our sun, to try to better understand our own world around us. There's an energy associated with that. There's something that just feeds the human curiosity and the curious spirit that exists within all of us. So some of the exploration that I participated in, notable is the Curiosity Mission where we landed a 2000 pound robotic geologist on a planet and within seven months met all of our science mission objectives in terms of determining that Mars was, and likely still is, a habitable environment: contains all of the elements, all the chemical elements, the building blocks for life, as we know it. Including what we know about extremophiles here on Earth, that there are ways, various oxidation states in the soil that these extremophiles could potentially survive underground.

The Cassini Mission which we just completed, which went to Saturn and spent nearly 15 years flying around the Saturnian system. We continue to learn even just from the last

90 seconds of data of that mission. We continue to learn about processes on that planet that we had no idea existed. The fact that the rings rain 10 tons of material per second down on the planet. And that material includes organic molecules. We've learned about that magnetic field of Saturn that we didn't expect, does not fit our models for the Earth's magnetic field, or what we know about planetary magnetism. And so it seems like at every turn, with every data set that we get is an opportunity to explore opportunity, to expand knowledge, opportunity to reflect on that back to what we do on Earth. And then an opportunity to use some of those technologies to give back to humanity here on Earth.

**Adela:** You know, what's pretty exciting about what you're doing is you're really talking about life changing events that are going to create a better understanding about our world and beyond. But one of the things that's really important when you're doing this exploration innovation is sometimes things don't turn out the way you expect. In fact I always say "you learn more from failure than success." Can you share with us how failure has really helped you in becoming who you are?

**Jordan:** Absolutely. And I totally agree with you that you learn more from failure than success. There's a quote from Theodore Roosevelt that permeates the Jet Propulsion Laboratory. It's in our control rooms, it's in our conference rooms, trophy cases, was a quote from a speech that Teddy Roosevelt gave back in like 1911, where he said, "It was far better to dare mighty things and to win glorious triumphs, even though you're going to fail along the way," (this is my summary of it), "than to live in the dim grey twilight that knows neither success nor failure." And so that's a charge and a mantra that we have that says, "okay, set the bar really high and expect that you're going to fail along the way, and also recognize that in those failures, that's when the deep learning, that's when you really start to understand the physical underpinnings of what it is you're trying to do, and get the essence of the barriers and obstacles to accomplishing it and then hopefully overcome them."

And so that has given us, and me personally, just a real different appreciation for failure. So when something fails, we know we're going to learn more about the physics, we know we're going to have an opportunity for even the things that will remain uncertain, that will be able to use other techniques like quantifying that uncertainty and learning how to model that uncertainty and live with it because we're not going to know exactly where we're going to land when we get to Mars, we want to be able to understand that. And also it allows people to not be afraid of failure and come up with new ideas, stretch the envelope on their thinking on something that- like the skycrane maneuver for landing Curiosity. That looked crazy at first, and it took us almost three years to

convince ourselves after constantly dismissing it as the wrong thing to do, took nearly three years before we convinced ourselves, “You know what, it has more inherent goodness about it and our ability to understand and verify it then most of our other concepts that were broken in other ways.” So once we convinced ourselves, we had to convince NASA headquarters. And so you know that essentially was a series of failures that led to ultimate success.

**Adela:** So I had a question on that skycrane moment, when did you get the “aha moment” that it wasn't such a crazy idea? I mean, when you think about it, it does sound pretty crazy. But when did you finally as a team decide it was worth going up the chain of command to get to that point and go for that, that moment of doing something where there could have been a high risk but a potentially high outcome as well?

**Jordan:** If I remember correctly- so it would have been somewhere around late 2003, 2004 timeframe. So it was about five years before our originally planned launch date. So, and speaking of failure, we did not make that narrow, three week launch window that we had to go to Mars. And so we had to wait, because the hardware, the technology wasn't ready, we had to wait 26 months. And so it was about five years before that first opportunity to launch that we finally convinced ourselves, and glad you mentioned, as a *team* convinced ourselves because the culture obviously is working on a team, but the culture is also that when one person has an idea, there's a lot of questioning of that idea to try to help not tear down the person's idea, but help elevate the group's understanding and the inherent goodness and inherent weaknesses in that idea. And so that by the time that idea becomes the skycrane concept, it's not one person's idea, right? It's the team's concept. And again, we tried to tear it down multiple times over several years. And at about five years before launch, we decided this is crazy enough to work.

**Adela:** You know what, it's interesting, when I look at the students in the Rocket Club, and Laura's involved in the Rocket Club, I see them testing all kinds of interesting ideas. And quite frankly, I love to see that communication, the banter, the experimentation. I think that's the beginning of really trying new ideas, don't you think Laura?

**Laura:** Oh, I definitely agree. It's a really big opportunity to try new things.

**Adela:** Well, what's really exciting also with the Rocket Club is I think we have one of the most successful rocket clubs because the students have so much freedom to experiment. And they have a wonderful facility in which they can experiment. And that's a real tribute to all the Aztecs and supporters of creating this type of environment of

innovation. What other areas do you think are important, Jordan, for our students so that they really can reach for the stars like you did and beyond in order to support them so they can again, work as a team? You know, feel great about failure and then try to become the innovators of the future. What are the tools that they need?

**Jordan:** One of the tools is the ability to separate your ideas from yourself, right? And to be able to separate other people's ideas from the people that hold those ideas. Allow your ideas to be challenged, and that's something that I do see the Rocket Project and the other multidisciplinary teams that are working in the EIS building have an opportunity to do. They come up with an idea, might be crazy, might not work, but they're willing to put it out there. And so when the challenges come, they come on the idea and they're not addressed to the person. And so learning that in a team environment as an undergrad or as a grad student, is something that will serve you well for the future.

The other one is the multidisciplinary nature of these teams. These projects that set the bar really high and dare mighty things like: we're going to send a rocket up 100 kilometers in altitude. Requires not just mechanical engineers, or electrical engineers, or aerospace engineers, physicists, marketing people, business majors, communications folks, the Baja Racing Club, the same thing, they're graded partially on their marketing package and their ability to communicate. And so those soft skills and the skills of recognizing that when you're looking at data, other one is bias, right, the unconscious bias, bias and decision making and being able to to understand and be aware that some people are going to weight the last data they saw as most important, some people are going to weight the, you know, the earliest data they saw as the most important and any of the later stuff they would dismiss. And so those opportunities to start to see those things and the soft side of engineering and the creative side of engineering and working as a team, I think is huge. And these big projects that SDSU students get to embark on with the faculty and with the community and a building like the EIS gives them an opportunity to exercise those and really learn those.

**Adela:** You know, I really do think you really are on point about the need to work across disciplines. The diverse opportunities by working with people in business, working in marketing, working with engineering and having the opportunity to just ask basic questions. I think the other piece that I think is really important for our students is what you said about separating the ego from the idea and I think that's probably one of the most difficult things to do when you're starting out in your career. How did you begin to know, or how did you check yourself on that?

**Jordan:** Well, it certainly wasn't easy. And I don't know that I can come up with an individual point where "ah, the light bulb went off!" There were certainly a lot of times where my ego was hurt and a lot of times where I questioned "why did I just get so frustrated by that interaction?" At one point, it was with my mentor. When I was a student here he mentored me from NASA and then I ended up going to work for him several years later. And I remember being challenged by him and being frustrated that, "he's my mentor, why would you challenge me?" And he wasn't challenging *me*, he was challenging some ideas that I had and you grow from that. And over time, the light bulb goes off, maybe it goes off nice and slowly, and you start to build those connections and start to see very subtle ways in which you can either be inclusive or not, in ways in which you can separate your ego from your ideas or not. And it all kind of comes together and coalesces into an awareness that, it probably took me five, six years into my career before I started noticing which leaders use pronouns that are inclusive of the team, which ones refer to all the activity as being done by "me and mine and I" versus "we," and watching how quickly you can alienate your own team by doing that.

**Adela:** You know, I think it's really interesting. When I look at our students today, and Laura, I think this is true of a lot of the students that are at SDSU, is that they are inclusive, they want to hear the opinions of others, and they don't want to have people who are left out of the team. Would you say that even in the Rocket Club, you see that?

**Laura:** Oh, definitely. We have meetings all the time. And we have sub teams, say structures, propulsions, and even in those teams we split off into different groups. And we always meet at some point and just spit out ideas and everyone's very open to everyone else's opinions. And I don't see many arguments between the team members because a lot of people are very open minded I think at SDSU, so there's not that many issues going on with the team. So we're all very open to each other.

**Adela:** So who knows, Jordan? Maybe our students are even further developed than you were when you were here at SDSU. They already embrace that culture of putting their ego aside and letting those ideas go back and forth, which is a good sign for the future, wouldn't you say?

**Jordan:** Absolutely true, they need to be better than we were when we graduated.

**Adela:** I mean, isn't that what innovation is about, when you can really see the next generation going leap years ahead of us? And I would say Laura is a good example of that. She's moving forward quickly, but of course, she has you as a mentor. I have to say that's a big advantage as well.

So Michelle, you connected us with Jordan and you're from the LA Council. I wanted you to give us some reasons why it's important to connect and how you were able to connect us to Jordan.

**Michelle:** Well, I really have the wonderful opportunity to work with roughly 25,000 alumni in the Los Angeles region and whether they're an Academy Award winning cinematographer, or like Jordan, the Deputy Director of the Jet Propulsion Labs, every one of them has asked me the question, "What can I do to help students? What can I do to help make their college experience as good as or better than the one that I had?" So I am, you know, I'm able to talk with them and, you know, offer up the many opportunities on campus like the Aztec Mentor Program to encourage them to come back and speak with students, to mentor students.

We just actually had a group last week of film and TV alumni, producers from Hollywood that came down and spoke to a whole group of students who are studying film and television to kind of give them an idea of what it was like up there in Los Angeles in the industry. So when we have groups of alumni come back and mentor students, whether it's one-on-one like Jordan is doing or as a group or whether they give back to support the, you know, the building of the EIS building as many people have done. Every one of our alumni is so dedicated to supporting the current students and the future of San Diego State to the point where- I haven't seen it, I may be exaggerating on this, but I really don't see this at a lot of other universities like I see it at San Diego State. The Aztecs really have a real zest for their university and for supporting it into the future.

**Adela:** Michelle, I think you're absolutely right. I mean, the connection of Aztecs helping Aztecs is really profound here at San Diego State. And I think it just is a testament to the great work that you're doing in Los Angeles as well. And I think the future is to keep supporting these types of relationships. So how are you going to continue in promoting these great relationships in the future?

**Michelle:** Well, we have a Los Angeles Regional Council. We also have one in the Bay Area. We have one up in the Pacific Northwest, one in Texas, one in Orange County and one in New York. And we look for dedicated Aztecs to join those regional councils and really support our mission of- they are ambassadors for the university. They are mentors of students, and they also help us with the philanthropic fundraising for the university. So one-on-one, I reach out to people and draw them in one-on-one to the regional councils. But also alumni like Jordan help me reach out to additional alumni. There are so many alumni in Los Angeles that have sort of not connected with the

university in 30 or 40 years and we're looking to reconnect with those people. So if they're out there listening, please contact the university. We'd love to talk with you.

**Adela:** Absolutely. And I have to say, Michelle, Jordan has done a wonderful job connecting with our students. In relationship to our our talk today, are there any other key issues that you want to touch regarding the importance of innovation and our capacity to support our students to make sure they can really go through whatever project and reach their dreams?

**Jordan:** Well, one observation I have in terms of engineering: engineers tend to get focused on whatever the problem that they were asked to solve, whatever scientific question they were asked to solve, whatever measurement concept they were asked to solve. And I think it's important for faculty to remind students and students to remind each other that there may be other opportunities to use that technology in a different way, maybe to help humanity.

I can give you a quick example of that if you'd like. You know we do a lot of remote sensing at JPL for looking at other worlds. But we had an opportunity to come up with an idea of using some of that microwave technology, remote sensing, and we developed something called FINDER which is about the size of a carry-on suitcase. And we built it, distributed around the world, and when there's an earthquake or some other disaster where a building collapses, you can put the suitcase in front of the rubble pile and it uses microwave signals that are about 1/1,000 the power of your cell phone, the same technologies that we developed for space and for scientific purposes, and it pushes those through the rubble pile and will detect heartbeats under 30 feet of solid concrete, 90 feet of rubble. And so in the recent Nepal earthquake, these were already deployed and were able to find people still with their hearts beating and the first responders were able to go straight in and help them. And so an opportunity to be able to to exercise your engineering in a broader way and think of fresh ideas and fresh ways to apply it I think is energizing to people too.

**Adela:** There are a couple of words that struck me that I think are really important, and the word kindness as well as being human were two words that I think are pretty special and really make a difference. And I think Laura, the work that you're doing and who you're going to become, you are the future and what's exciting is that you have this wonderful relationship with Jordan who can pass that knowledge. Do you want to end with any important observations as well?

**Laura:** I think my most important observation right now is Jordan. I really like his position at JPL right now. And I like him as a person. And I think it's important for someone like me to see that someone who's kind and light-hearted can get to a position so high up and is just so knowledgeable and it's a really good position to be in to have him as my mentor.

**Adela:** That's a gift, Jordan, that you're giving to our students but more importantly we're thinking about the fact that we are creating the types of compassionate leaders and global citizens and ethical innovators who are going to take their education here at SDSU and really make a difference. So we want to thank you so much for everything that you do as an Aztec. We're so proud of what you've done and we really look forward to a long Aztec future so thank you so much.

**Jordan:** Thank you very much President de la Torre.

**Perette:** Folks, thank you for being a part of *Fireside Charla*. You can join the conversation by sharing your comments and questions for President de la Torre at [sdsu.edu/firesidecharla](https://sdsu.edu/firesidecharla). There you can also access the transcript for this episode and an expanded question-and-answer section that includes other exciting projects Jordan is working on. Plus, inspiring advice to help us all make an impact in the world too. And be sure to connect with President de la Torre on [Twitter](#), [LinkedIn](#), and [Instagram](#).

This is Perette Godwin, a proud SDSU alum, hoping that you are inspired to create some interesting charlas of your own.

**Narrator:** Next month, President de la Torre and James Frazee, Senior Academic Technology Officer and Director of Instructional Technology Services at San Diego State University will have a chat with two of our most innovative educators, Dr. Katie Hughes and Dr. Harsimran Baweja, who share how they are transforming instruction and why we need to reinvent the classroom to educate the students that will become the leaders of the future.

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