



EVELYN MIRALLES: VIRTUAL VISIONARY

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Her dreamy eyes envisioned the impossible—until it wasn't.

Evelyn Miralles is not your basic rocket scientist. In a department overwhelmingly populated by bearded, bespectacled men, she's a feminine force of nature. Her intellectual gifts landed her at NASA, but her innate survival skills; a warm personality, intense curiosity, personal initiative and collaborative nature has kept her there. As documented in "Hidden Figures," the 2016 Oscar nominated film about Katherine Johnson, the African-American mathematician behind the '60s space race, there is a history of 'under the radar woman power' at NASA. And yes, this time, 18,250 days later, it's a hidden Latina coming up for her long due recognition. For twenty-five Earth years Miralles' big, beautiful brain has been crushing preconceived models of thought innovation, and piloting new dimensions launching her own 'virtual architecture' in space. As Principal Engineer and Lead VR Innovator for the astronaut training facility at NASA Johnson Space Center, Evelyn far surpassed her earliest ambition to design buildings; Miralles' premiere project was the construction of a 3D model of a habitat on the moon. Before joining the VRLab, she worked as a Lead Graphic Simulator and Software Developer for the Integrated Graphics Operations & Analysis Laboratory (IGOAL) in the JSC Engineering Directorate. Technology's unlimited potential spoke directly through Evelyn; effectively since 1992, Miralles has been passionately involved with space shuttle and International Space Station missions.

While VR is the current "hot topic" on the lips of every tech thrill seeker, it's practically 'old news' for Evelyn Miralles and her team. Since 1993, her Dynamic Onboard Ubiquitous Graphics has been used to simulate space operations. Evelyn's work at NASA's Virtual Reality Laboratory (VRLab) is used to train astronauts in extravehicular activity. How's that for leading edge? This is a great example of the importance of NASA as a place where great female minds may flourish. Overseeing the development and operations of the Virtual Reality Laboratory (VRLab) utilized for Astronaut space training, Evelyn's VRLab is responsible for Extra Vehicular Activities (EVA) or Spacewalks, Simplified Aid for EVA Rescue (SAFER) runs, Mass Handling scenarios and Robotics operations. As the pioneer of VR, there is no one better positioned to explain the history and future of VR technology application for space exploration than Evelyn Miralles.

In a career trajectory that can authentically be described as meteoric, Evelyn's designing work began with computers at the University of Houston. In 1990, she graduated from Lamar University and, in 1992, from University of Houston—Clear Lake. Miralles' degrees in Computer Engineering, Computer Graphics, and MBA in Management of Technologies from the University of Houston provided the foundation for the innate gift and mystifying grasp of dimensions beyond others' perception. She was the co-author of the state-of-the-art Dynamic Onboard Ubiquitous Graphics (DOUG) which has been used since 1993 for training in virtual reality by astronauts of STS 61 mission who repaired the space telescope Hubble, and then for all the other missions. DOUG has been distributed to all NASA centers and other institutions around the world supporting our International Space Partners. Miralles also worked in the space station ISS, designing the structure and work steps for astronauts and serves as the active EVA Chair member for the AIAA Houston Chapter.

Her accomplishments are legion, and while NASA has awarded her the 2009 NASA Exceptional Award for Innovation for the Engineering DOUG Graphics for Exploration software (EDGE), and the prestigious NASA Flight Safety Award in 2012, the non-space world is just catching up with Evelyn. She was named one of BBC's 100 Inspirational Women in the World, 2016, CNET in Spanish named her one of the Top 20 most influential Hispanics in the US, 2016, and she was honored with University of Houston—Clear Lake - Distinguished Alumna Award — 2016. Evelyn's addressing Hispanicize 2017, where her achievements and insights will inspire awe and appreciation. Meet the no-longer hidden Latina of NASA, Evelyn Miralles.

Numbers are in her blood, but her father's support was her nourishment. Evelyn grew up in Caracas, Venezuela. Although she has been in the US for thirty years, her soft accent lingers; it is a definite asset. One of five children, three brothers and two girls, Evelyn is the youngest. "I was the surprise," she laughs. Her dad worked as a paralegal in the oil industry. "My biggest influence was my father. He was a hard worker and very responsible. I saw that first: you work hard, you're going to get there. Growing up, he never treated me like a girl; he never treated his daughters differently from his sons. He always supported me saying, "You're going to get a degree, you're going to college and you're going to be independent, you're not going to depend on anyone."

Evelyn was drawn to art and making things. "I was always building something. I have that engineer inside; the art with the logic." As a girl she emulated her oldest brother. "My brother, the mathematician, was always studying." Evelyn's other siblings include an electrical engineer, and her sister is a chemical engineer. Numbers and science didn't daunt her. "I had no fear. Nothing is that difficult that people can't understand; you can really learn anything; it's about how much you want it."

Architectural Dreams became Virtual Reality.

"As a girl, I drew and built things and thought, maybe I'm an architect." She gradually moved into a more theoretical and futuristic artistry. "I went into the graphic arts design and then into computer design because I had to program it. I had the ability to logically think about it, step by step." "I saw that I really loved computers. I loved to work with the hardware, the logic of writing programs. At the University of Houston, I studied computer science. After that, I got the position at NASA." Evelyn's combined skills were a fit. "They were looking for someone with a background in computer graphics. I really wasn't looking at it like 'It's NASA!' My ultimate goal was to do what I wanted to do. I had better offers than NASA but I liked the team, I felt pretty comfortable."

Then things got tough. NASA's 'sink or swim' ecosystem tested every instinct in Evelyn's survival kit. "My first year was intense! There are so many moving parts! You see the scope of the job you're going to do and you think they're going to hold your hand. No. It's you going out there and figuring out how this all integrates. Many people are compiling their own part and they all have to come together and work, so all that was very complex, this was at a level where you needed to go on your own." After the initial shock, Evelyn found her footing. "I read a lot, and I relied on my own creativity to ask the right questions. We had four women on the team--the rest were men."

Things got better. "The job started to get interesting after my first year. A manager asked me, "Can you build this for me?" At that time we had engineers working on a few projects at a time, when projects got funded we went forward. We did many different things, programming graphics software; I worked in software development, software integration. In the face of constant challenges, Evelyn did not panic. "I'm a mover, I don't get static,—that's my character. I always try to modify, do something better. The curiosity lives in me, wanting to improve the system. It's not difficult but you have to want it."

It actually sounds pretty daunting. "Working with type A personalities—everyone in that room is very accomplished, intelligent. You have very competitive people, with masters, PhD's, a lot of engineering background, so when you talk you better know what you're saying." Evelyn stresses the team-playing aspect. Unlike some professions where looks are considered an advantage, Evelyn rains on that fantasy as it applies to NASA. "It's not because you have a pretty face that you got the job—you have the knowledge!" It's easy to imagine Evelyn saying this now to her two teen-aged daughters. As a mom, Evelyn doubtless has huge life lessons to impart, but this is her mantra: "You have to know how to deal with people. Being a female in that realm of knowledgeable people you are one of a few. It's a delicate dance. Dealing with people is complicated. Know what you're bringing to the table. You need that self esteem."

Evelyn's secret to her longevity at NASA is love your work. "Really, VR has been my life." Everyone says Evelyn IS the VR LAB. "When I was pregnant I was here until the last moment my daughter came to life. We try to make it a place that's fun and happy; we were doing something very unique that allowed us to open up and be free, and to be our own boss. I credit my being here so long to my great communication with our team. Being very open. We're like brothers. We truly respect each other. It is very important to maintain the happy environment. We're training astronauts! It's such a great job. Freedom of creation also means picking the right people because while we're making jokes, we're also doing something very unique. I have accomplished many things but this is about a team. The kind of management and leadership I've seen at NASA is something that I hope continues and I try to pass along." Evelyn is onto VR's next big thing, Augmented Reality.

"Space exploration, it's a passion for me. I want to see the technology flourish beyond me. Imagine somebody standing on the moon looking at the earth through a VR helmet that allows all the children in one school to see what that astronaut is looking at. I love to empower people. Right now we're sending a new helmet into space, so we're working on that upgrade. That's what we do with the astronauts; these three people we send are fantastic. One day I would like to write a book, sharing those experiences."

In 2011, Evelyn kept the VR Lab moving forward and connected with the outside VR world. "When we ended the space station, the shuttle was cancelled. I decided to take what we did out to the world." She addressed NASA decision makers. "I told them I was going to give a presentation at the Silicon Valley Conference of Virtual Reality. I also wanted to see what they were doing with VR."

This was a watershed moment. "The Silicon Valley Conference organizers asked me "Is NASA

doing something with VR?" Evelyn clued them in. NASA's VR history began in the 50's and 60's where the use was probed for military use.

Development picked up in the 90's. "It's been a slow process because it was so expensive. Our company hardware was \$2 million when we started—just for the lab. Of course the cost for NASA is still high because of the software we're designing."

Stunned, the Silicon Valley conference wanted NASA, and Evelyn-on board. "They asked me to come present. I put together a presentation with no words- just pictures.

There were 2,000 people, and of the 60 presenters, just three were women. Evelyn captivated the crowd. "I said, 'I'm not an astronaut. I'm just an engineer. We've been

doing this for years and years.' People were shocked." For that community this was a revelation!

Afterwards, she was swamped. "A line of people waited to talk, including the Navy who were trying to build a VR for training people on different ships. Soon, all those people started visiting NASA, trying to get inside." That was four years ago. "That opened up social media. I was the first one to unlock that door. The VRLab was for building experiments, an experience that was now huge. I was very proud to share our story." What's next? "VR is all about the content. Creating content so you can feel it in VR form is not easy, but you need something very powerful! You can train early med students with VR. Next is medical psychological testing. For content, the big step is AR Augmented Reality." For Evelyn Miralles it's all logical. For those of us playing catch up, the world will never be the same, and just think, it was a hidden Latina who opened that door. ●

