Star Power

France Anne Córdova
Head in the stars

“We don’t have any idea what our limits are. When you’re out on some of these frontiers, people sometimes don’t understand where you’re going. I want people to feel comfortable with the leading edge.”

—France Anne Córdova, astrophysicist and vice chancellor for research at UCSB
feet on the ground

STORY BY MELINDA BURNS

France Anne Córdova's name is on Mars, inside a spacecraft that's never coming back. It's an honor that Córdova earned for her leadership as chief scientist of NASA when the Mars Pathfinder was conceived and built. On July 4, when the Pathfinder touched down on the red planet, it was carrying a CD-ROM with a dedication to Córdova. And there it will stay — unless, she says, "we decide to have trash collection in space."

Today, at 49, Córdova is the vice chancellor for research at UCSB: Her colleagues like to brag that she's the only rocket scientist in the post at the University of California.

"I find her to be one of the most inspiring persons on campus right now," says Victoria Vesna, an art studies professor at UCSB. "She truly has a vision and it is broad and expansive. Her vision is beyond her own ego: It allows her to be free and take risks."

Córdova has had her head in the stars for a long time. As an astrophysicist at the Los Alamos National Laboratory in the 1980s, she was one of the first to measure the X-ray radiation coming from white dwarfs — old stars with intense gravitational fields — and pulsars, stars that flash rhythmically like fast-spinning lighthouses in space.

When astronomers first discovered pulsars in the 1960s, the media reported the phenomena as LGMs, or Little Green Men sending out signals.

Today, Córdova is working with European scientists on the construction of a space observatory that will reveal new secrets about these mysterious stars. She will also peer into the interior of galaxies with jets of gas coming off them and massive black holes inside. She has written more than 100 scientific papers.

"I love astronomy and the stars," Córdova says, "but what I'm much more excited about is how matter behaves at the atomic and subatomic level. It's bizarre stuff — different from how tables and chairs on Earth behave. There is no place to study it but in space."

Córdova can read the night sky so well that once, camping on the floor of the Grand Canyon, she spotted an exploding star, or nova, in the narrow slice of heaven visible above the canyon walls. Novas "pop off" suddenly,
becoming thousands of times brighter for a few hours or days.

When Córdova hiked out, she read on the front page of the local newspaper that amateur astronomers had discovered Nova Cygni 1973.

"I was not the first to see and report it, but for me it was my discovery all the same," she says.

"What's fascinating about science is all the mystery. Who are we? Where did we come from? We are not all there is."

CÓRDOVA'S METTLE TESTED AT NASA

When Córdova was hired as chief scientist at the National Aeronautics and Space Administration (NASA) in 1993, she was the youngest person ever to hold the job and only the second woman in the post.

She left last year for UCSB with NASA's highest award, a Distinguished Service Medal, and a reputation as an iconoclast who questioned the old ways of doing business. She had the gift, her co-workers say, of being able to unite people of diverse backgrounds for a common goal.

"None of the other chief scientists brought to the job the energy and inquisitiveness and the understanding of the challenges before us — not enough money and too many great ideas," says NASA comptroller Malcolm Peterson. "France has got just a tremendously creative intelligence. She's very open, in a way that a really good teacher is open to the input from students and is willing to learn."

Córdova was put to the test when, in the interest of doing things "better, faster, cheaper," her bosses recommended downsizing NASA's nine research centers, to the point of closing two of them — a move that would have significantly weakened the agency's scientific effort.

It was a tempestuous time. Córdova fought for the scientists and almost singlehandedly saved the most effective programs. She created a new institute for the study of space biomedical sciences. Not one of the centers was shut down.

"She showed her ethical courage," says UCLA Executive Chancellor Charlie Kennel, who was at NASA during that time. "She stood up for what she believed in and won her issue."

Córdova also won concessions for the public's right to know. Traditionally, NASA scientists had had exclusive rights to their data from space explorations, including the Hubble Space Telescope, until such time as they could publish their results. Sometimes the data was just stashed away in drawers and forgotten.

Córdova convinced NASA scientists that the public — and their colleagues outside the agency — should have access to new data from space within a year after NASA got it.

"France simply struck a blow for common sense," Peterson says. "The essential thing was that we were using the taxpayers' money and that they had the right to know as soon as possible, so that everyone could say, 'Wow!'

"France raised the issue. She had to carry the ball a lot with the scientific community, which was reluctant to change."

ASTROPHYSICIST AND NOVELIST

When people at UCSB talk about Córdova, they often say, "She's a breath of fresh air."

For one thing, she is a rare hybrid: an astrophysicist with a bachelor's degree in English. As an undergraduate at Stanford University, Córdova toyed with anthropology. She spent a summer in a Zapotec Indian village in the state of Oaxaca, Mexico. She wrote a short novel, called "The Women of Santo Domingo," about her experiences there; and she wrote a Zapotec cookbook. She also was a guest editor for Mademoiselle magazine in New York City.

"Literature allowed me to visit the past and the future simultaneously," Córdova says. "It answered a hunger in me to travel, to see, to understand all that I could about human experience, as fast as I could."

Then, in the summer of 1969, Córdova watched the televised landing on the moon and a show on the origins of the universe. She threw herself into the study of stars, ultimately earning a Ph.D. in physics from the California Institute of Technology, one of two women in a class of 18.

"It really spoke to something in me," she says. "It woke up something primitive inside."

As a young astronomer, Córdova pioneered a new approach to studying the stars. She helped mobilize hundreds of her colleagues around the world — amateurs and professionals alike — to simultaneously point their telescopes at the same fleeting events in space: the stars that pulse, flare and explode.

These "observing campaigns," which are still performed today, employ telescopes on the ground and in space to examine the elusive radiation of celestial bodies at many different wavelengths, from gamma rays to radio waves, probing galaxies that otherwise would be invisible.

The X-ray, optical and ultraviolet observatory that Córdova is presently helping to build will be launched on a rocket from French Guyana in 1999. It will circle the Earth for 10 years in an orbit one-third of the way to the moon. It may be one of the last observatories of its size, Córdova says, for the focus now is on smaller missions in space.

As vice chancellor of research at UCSB, Córdova would like to get the entire campus more involved with research in space. She wants the pub-
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known as the kind of person who will not say to someone with a grand idea, “Get down to earth and be realistic.”

“I’ve always found her to have a certain aura that inspires others,” says Vesna. “People like that move people around them who normally are static.”

SHE RECONSIDERED MOTHERHOOD

Córdova was born after World War II in Paris, France, where her father, a West Point graduate of Spanish and Mexican descent, was head of CARE. Her parents had expected their first child to be a boy, whom they would name Frederick III. Awaiting the event, Córdova’s mother embroidered little “F’s” on her baby clothes.

No problem. When the baby turned out to be a girl, she was baptised Francoise in the Notre Dame Cathedral. Córdova later Americanized the name to “France.” It was her fate to be the eldest of 12 children — the serious, dependable big sister who came home from school every day and folded a stack of diapers, ironed school uniforms and performed baby-sitting duties.

It’s no wonder, she says, that later “I just didn’t have any desire to have kids. I could have missed out on it.”

At 36, though, while rock climbing, she met her husband-to-be, Christian Foster, a high school teacher of earth sciences in Los Alamos, N.M. At 38, Córdova gave birth to a daughter, Anne-Catherine. A son, Stephen, soon followed.

Through the years, Foster has adjusted his career around Córdova’s. He presently works for UCSB’s College of Letters and Sciences developing programs to take campus research into the local schools.

The family’s first move was from Los Alamos to Pennsylvania State University, where Córdova took a job as head of the Department of Astronomy and Astrophysics. Then, just as Foster was preparing to begin his doctoral dissertation in science education, Córdova was offered the job at NASA.

They moved again, this time to Washington, and Foster found a job as a scientist with the National Oceanic and Atmospheric Administration, assigned to the White House. But the couple did not plan to stay long in the capital.

“I did not want to be a federal civil servant,” Córdova says. “We didn’t want to be seduced into the whole Washington thing. We had heard about the lure of it. You can think that’s the world. But the world isn’t like Washington.”

Her real home is at the university. UCSB has proven to have “a freshness of spirit about new approaches,” Córdova says, adding, “Out here the kids are looking at this experience as a chance to think, to develop themselves. They are not so goal-oriented to become doctors and lawyers.”

PESSIMISTIC ON WOMEN’S PROGRESS

On a recent afternoon, Córdova takes the stage at a UCSB theater, a tiny figure in a short black dress, to talk about women in science. And with an air of quiet authority, she announces that she is not optimistic.

“There is hierarchical discrimination,” she says. “The higher you go, the fewer women you find. It’s not enough to get more women into the pipeline. This is naive. Progress is not inevitable.”

For a group that holds up half the Earth” — as the Chinese saying goes — “We are not doing all that well,” Córdova says.

She puts up a transparency with the results of her own informal survey at UCSB. It shows that only four out of 44 department heads on campus are women. Four out of 32 directors of UCSB research centers are women. One of eight deans and provosts is a woman, but she is only an acting dean. Only one out of seven senior officers is a woman.

And in 42 years, the faculty Academic Senate has not once chosen a woman as the most distinguished researcher of the year.

“Women do not hold up half of UCSB,” Córdova says.

It’s true that women scientists can be found elsewhere in high places. But Córdova likens the phenomenon to the middle-aged stars that flare up brightly in the universe and then return to “what they have always been — dim stars that will be on their evolutionary track for a long time.”

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Women who are promoted often move on and are not replaced with other women. And when key decisions are made, such as choosing a department head, women seldom are asked to participate in the elaborate rituals that take place, Córdova says. She calls it “the aliens challenge.”

“Isolation is different from being alone,” she says. “Looking up at the stars on a dark night, you are alone, but you feel in touch with the pulse of the universe. But isolation is being kept out and left out, not invited to the table for important meetings. Women need to be there to get information and gain credibility.”

Then there is the “macaroni and cheese challenge,” Córdova says — the dual role of working mothers. Here, she points to the need for childcare, parental leave and other family benefits. In her home, Córdova and her husband switch off every other night: One cooks dinner and washes the dishes, and the other puts the children to bed.

Córdova also cautions successful women scientists not to turn their backs on the women coming up behind them, but to reach out and be mentors.

“The agents of change themselves have to resist becoming part of the processes that once excluded them,” she says. “It’s not enough to be leaders in our own fields. We have to take responsibility for the future.”

Women drop out of science because of its narrow focus and because they are not welcomed, Córdova says: Hence, universities should bring humanistic values into the teaching of science and stop trying to treat women the same as men.

“The way men treat men is not acceptable to many women,” Córdova says.

While at Pennsylvania State, she argued against the practice of ‘weeding out’ science students by giving them low grades in the first semester. Students should not get the message that if they can’t pass calculus, they can’t be scientists, she said.

“Let’s weed out ‘weeding out,’” Córdova wrote in a 1992 essay. “It is an elitist attitude that perpetuates the fanning of scientific peacocks while sending a wealth of other noble creatures to enrich disciplines outside of science.

“Who are the ‘best’ anyway, and what makes us so sure we can identify them? We must learn to enable, not disable, the young minds that look to us for knowledge.”

In the end, France Córdova — astronomer, vice chancellor, iconoclast, lover of literature and mother of two — is left with only questions.

“How can you gain acceptance without sacrificing your ideals?” she asks her UCSB listeners. “Why is it so difficult to get change slowly? Why is it always an upheaval?”

She might as well have asked how separate galaxies came out of the Big Bang.

“Women’s greatest challenge,” Córdova says, “is to be taken seriously.”