

THE STARS

HER DESTINATION

NATALIE BATALHA'S WORST ENEMY IS THE CLOCK.

Installed around the corner from her office at NASA Ames Research Center, a looming LED display is counting the days, hours, minutes and seconds until the launch of the *Kepler* Mission: NASA's first attempt to find habitable Earth-like planets in our galaxy.

"It's terrible," says Batalha '89, who has been working on the mission for eight years. "It recently rolled over from 300 to 299, and I could just feel my blood pressure rising."

When the clock runs down to zero next spring, Batalha will stand with her family at Cape Canaveral in Florida to watch *Kepler*'s take-off. The spacecraft's telescope will peer at one slice of the sky for three-and-a-half years, to look for signs of terrestrial planets using a technique called the *transit method*. Batalha likens the process to a fly passing in front of a car's headlight: Every time a planet passes in front of the star it orbits, it dims the star's light a little, the same way a fly would dim a headlight as it flew past. As part of preparation for launch, Batalha

A BUSINESS MAJOR'S EPIPHANY LEADS HER TO BECOME A NASA SCIENTIST **BY ROBERTA KWOK**

has been choosing—very, very carefully—the 170,000 stars that *Kepler* will observe from among the 13 million in its field of view.

Batalha may be feeling the pressure, but it doesn't show. Her voice has the warm, calming quality of a public radio host, and when she demonstrates the orbit of a planet around a star, her movements are poised and exact. "Can you imagine that within your lifetime, you will probably be able to look up in the sky and say, 'That star right there has a habitable Earth-like planet orbiting it?'" asks Batalha, an associate professor at San Jose State University. "That's astounding. It's going to change the way people understand their place in the universe."

Batalha wasn't always enamored of astronomy. She began her undergraduate career at Berkeley as a business major. "To me, a scientist was someone who wore a white lab coat and poured things into beakers and was alone all day," she says. "I didn't understand at all what it was about." Then one day, as she was carrying laundry up the stairs at home, a fanciful question struck her. If she could do anything—the sky's the limit—what would it be? The answer came right away: She wanted to work for NASA.

Thinking that she might work as a mediator between business and science, Batalha enrolled in a physics class and was "terrible" at it, she says. But as her professor explained the mathematics behind the formation of rainbows in oil puddles, she was "blown away," she recalls. "It was like a religious experience for me—that the universe is so ordered. That's profound, right?"

Needle in a haystack: The scope of the job hits home when you see the massive star chart covering a wall of Batalha's office. Even the small area shown in detail here contains many hundreds of stars.

Batalha became slowly immersed in the practice of science, first completing a research internship at Wyoming Infrared Observatory and then working in the lab of Gibor Basri, an astronomer at Berkeley. She recalls one day, while they were sitting at a computer looking at observations of young stars, or "baby Suns," from a new instrument at Lick Observatory, when Basri turned to her and said, "Natalie, no one else in the world has data like this." The thrill of discovery, she says, clinched her decision to be a scientist. "It must be, on a much smaller scale, like the feeling Galileo had when he saw Jupiter's moons," she says. "That's the gateway drug."

Batalha is now one of five Ames scientists on the *Kepler* Mission, NASA's \$572 million attempt to find other potentially life-bearing planets in our galaxy. One of her early contributions to the project was convincing the science team to move the telescope away from the plane of the Milky Way, where bright giant stars would obscure the fainter, Sun-like stars they wanted to see. "It's like trying to see a firefly in front of the San Francisco skyline at night," she says. Though the team had talked about the contamination problem before, Batalha settled the issue by calculating the advantages of switching to a different part of the sky, where they would still see plenty of stars but eliminate a lot of noise.

"Natalie was one of the few people to realize that the original target region chosen for the *Kepler* Mission was a mistake," says David Latham, a mission co-investigator and senior astronomer at the Smithsonian Astrophysical Observatory.

Even if *Kepler* doesn't find any habitable Earth-like planets, "that's profound too," Batalha says. Such a result would substantially diminish the likelihood of alien civilizations beyond our solar system, suggesting that we may indeed be alone in the galaxy. But Batalha admits that she's a closet optimist. "Even in our own solar system, there might be microbial life, and that's exciting," she says. "Who knows what's out there?" She'll be counting the seconds to find out. **E**

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