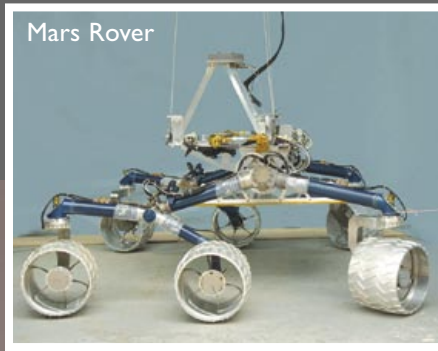




Darya Bronston



Mars Rover



Jaime M. Waydo

MAKING COSMIC HISTORY

BY ISABELLE GULLÖ

Women may be from Venus, but when it comes to the female scientists, engineers and designers involved in constructing NASA's latest rover, it's all about Mars—the new Mars Science Laboratory (MSL), developed by Jet Propulsion Labs (JPL) in Pasadena. It will become the third generation of rovers to explore the red planet.

Altogether, NASA has about 1,000 people working on the new mission, each person playing a key role in its development. Santa Barbara is making its contributions, too, thanks to local entrepreneur Darya Bronston. Her small business, DKB Resources Inc., and its team of engineers, designers and program managers have already helped put two rovers on Mars by providing engineering, layout and manufacturing support for JPL.

“During the Spirit and Opportunity missions, we helped with many of the circuit boards used in the cruise stage and the camera board that takes documentation photos during the lander stage,” says 38-year-old Bronston. Her company and its partners are also responsible for the engineering, design layout and manufacturing support of the

JPL Decoder boards housed in only three locations worldwide. “These boards decrypt all of the information coming from U.S. satellites, rovers and other flight projects doing research in space,” she explains.

This rover boasts greater capability and newer technology than previous missions.

“The MSL will reach a greater area of Mars than previous rovers, and it uses a brand-new landing technique,” attests JPL's Jaime M. Waydo, lead mechanical engineer for the rover's mobility system (essentially everything that makes the rover move). “We have a descent pod that flies us down close to the surface. Once we get close, we release the 1,900-pound rover from the pod, lower it on a rope and set the rover down on the ground. We're landing right on the wheels.”

Not only is the MSL the first rover to guide itself toward the Martian surface, but it will carry equipment for taking samples of rock interiors, as well as instruments for observing weather and determining the presence of subsurface water, Waydo explains.

Talk about rocket science.

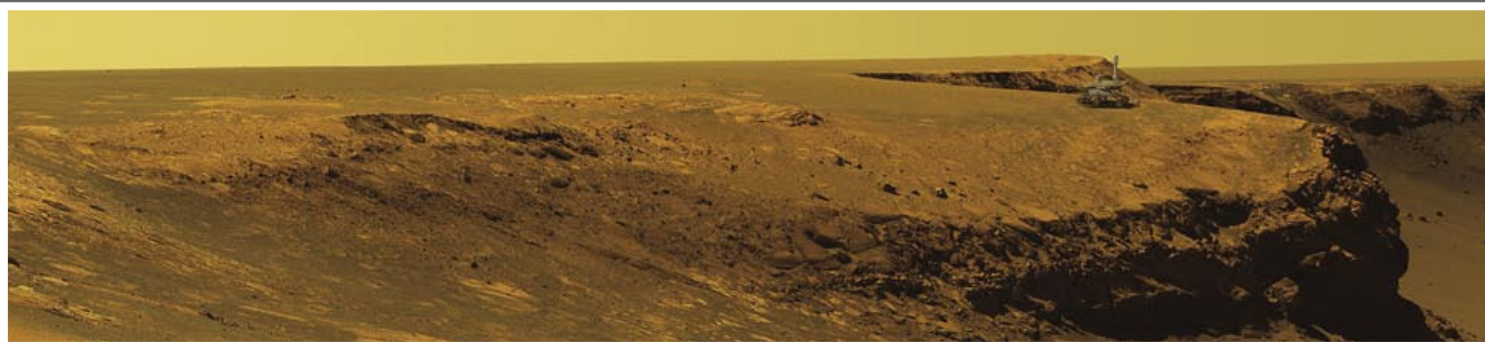
Basically, MSL is a roving geologist with an organic chemistry lab onboard. It has 10 different science instruments—an incredible amount of science—and is the largest rover ever built. “We started with Sojourner in the late '90s,” says Waydo, who has worked on the MSL since the very beginning in 2003. “That rover was

about the size of a shoe box. Then the rovers grew to about the size of a coffee table. Now, with MSL, the vehicle is the size of a Mini Cooper and has the capability to traverse more terrain and drive longer distances.”

Listening to Waydo and her colleagues discuss work is impressive and mind-boggling at once. It's a bit like listening to people conversing in a foreign language. Clearly, you have to be somewhat of a rocket scientist to do this job, but Waydo, a NASA employee since 1999, takes a modest approach to her job and the fact that her contributions are, literally, making cosmic history. “MSL is a fun project that challenges me every step of the way,” she says. “It's really neat to see all of your hard work coming together in the hardware and positive testing results. We definitely have a lot of really talented and dedicated people working on this job.”

But forget the stereotypes of male engineers with buzzed haircuts, white lab coats and pocket protectors. Most of the scientists and engineers joining JPL these days are in their 20s and 30s, and about a third of them are female, a number that seems to be growing. Waydo, for instance, is only 31 years old and has been with JPL for nearly a decade. Most days, you'll find her dressed in black slacks and a pretty blouse or sweater—

Photos of Darya Bronston and Jaime M. Waydo by Isabelle Gullö



sans pocket protector. The times are changing.

"Many of our older experts are retiring," Waydo explains. "On one hand, it's a great opportunity for people like me to fill the gap. Still, we're losing our father figures and a lot of the invaluable knowledge they carry. It's a challenge sometimes because you don't have the same sense of security."

Speaking of challenges, the ones faced by the MLS staff are not exactly your typical workday dilemmas. Deputy project scientist Joy Crisp puts things in perspective: "We worry about staying within our budget [roughly \$1.8 billion], successfully launching from Earth and landing the oversized rover on Mars and solving the myriad engineering technical problems that come up during development and test of the spacecraft and instruments."

Yet the team's biggest challenge, perhaps, is to meet the MLS's strict launch date in the fall of 2009. "We only have favorable opportunities to go to Mars every 26 months, when the planets line up," notes Crisp, 50, who has worked on the MSL for two years.

Crisp and Waydo agree that there's rarely a chance for boredom in their profession. "After years of working on these types of projects, I sometimes get lulled into how ordinary it feels to be looking at new pictures of Mars every day," says Crisp. "But it's not! When I give talks to the public, I'm reacquainted with people's excitement for these missions and recognize how special it is to be involved in them directly."

So far, one of the biggest challenges for Santa Barbara's Bronston has been

matching up the right people with the right projects. "It's an intricate balance, constructing creative and successful work teams between our designers and the scientists and companies we work for." The work of DKB Resources has been so well received that JPL and NASA honored Bronston and her colleagues for their work with a prestigious award in 2005. "My inspiration comes from finding small and big ways to achieve excellence," she says. "The intensity and quality of work we're engaged in is really a source of pride and personal achievement given the many hours that

when they present themselves."

Waydo, on the other hand, knew in seventh grade she wanted to work for NASA and build hardware to go to Mars. "This is a dream job for me," she says. "I feel so fortunate to work in the field I love, doing exactly what I always wanted to do." "I get to go talk to school kids about what I do and why math and science are important. I tell them that they can also send spaceships to Mars someday if they just stay in school and work hard."

Glad to see more female students going into science and engineering, Waydo

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ONE COMMUNITY CAN CHANGE THE WORLD."
— DARYA BRONSTON

we invest."

In addition to its contract with NASA, DKB Resources Inc. aligns itself with companies engaged in alternative energy, civilian space flight, underwater exploration, medical advancements and "green" alternatives within the printed circuit board (PCB) industry. Her company's motto? "We believe that one project, one company, one community can change the world," says Bronston.

While Bronston and her team are truly making a difference on a global level, particularly in the world of space travel, the former photography student, artist and sales director didn't grow up dreaming she'd be involved in this line of work. "It was circumstance and curiosity that brought me here," she says. I love working with people and offering solutions to create successful projects. You have to be open to new opportunities

points out that JPL hires a great number of women these days. "The bar is high to work for NASA and JPL, and it has nothing to do with whether you're male or female," she notes. For Waydo, being a woman in a male-dominated world has never been an issue. "I just worry about being the best engineer I can be. I want people to always look at what I as an engineer—not as a woman—can bring to a job."

Right now, the young engineer is busy worrying about building and perfecting the mobility system of a rover that will climb rocks much bigger and drive distances much farther than any previous mission. The biggest reward in the end, she says, "is the day we see the MSL's first tire tracks in the dirt on Mars, knowing that those tracks look the way they do because we designed them that way." Cosmic indeed. ★