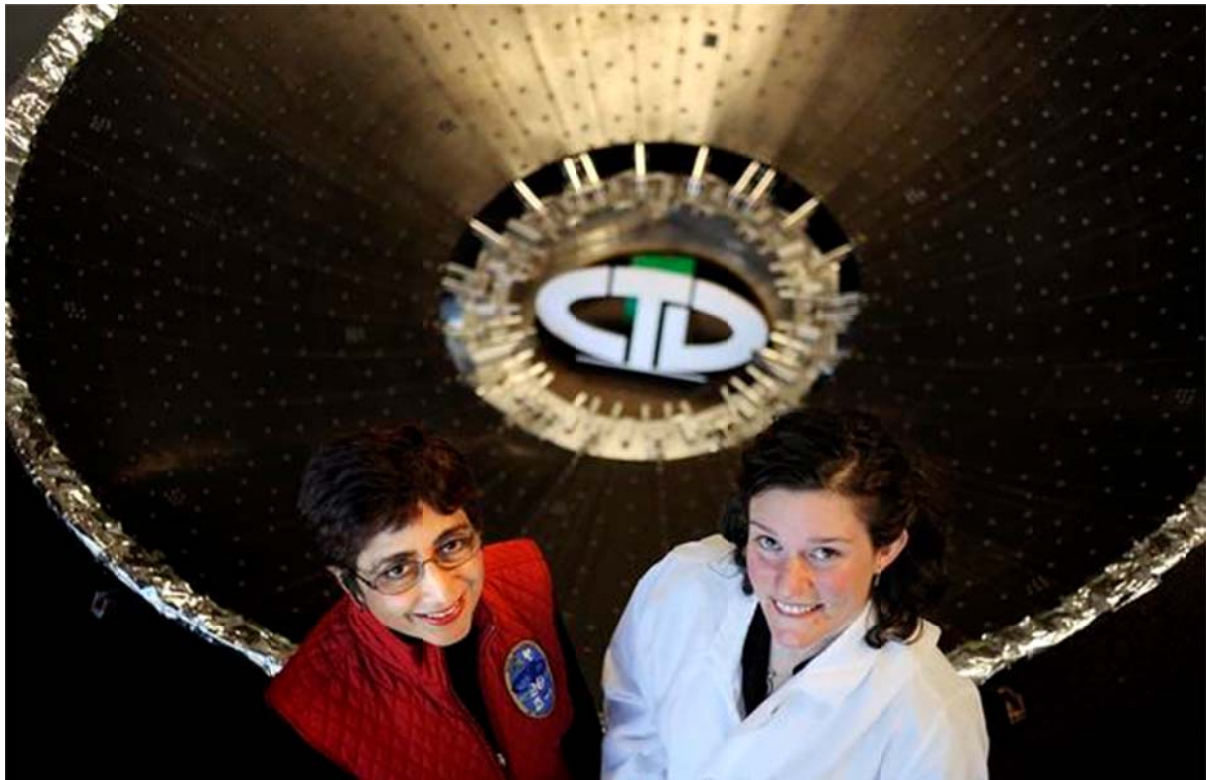


## Women persevere to rise in aerospace field

[By Ann Schrader](#)

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Aiming high. Naseem Munshi, left, president and chief chemist at Composite Technology Development, and space deployables manager Dana Turse, at their lab in Lafayette, are active in Colorado's aerospace industry. profile, 4K (RJ Sangosti, The Denver Post )

Each spring for the past 26 years, the global aerospace community has gathered at the Broadmoor in Colorado Springs.

The prestigious National Space Symposium attracts thousands of space industry leaders from business, military, defense, government, intelligence, education, science and finance.

"It used to be all old white guys," said Tom Clark, executive vice president of the Metro Denver Economic Development Corp. "Women are still in the minority, but there is an increasing number of women in aerospace.

"There are not that many of them, but you're not surprised to see them anymore. One day you look around and say, 'Holy crap, there's a lot of them.' "

Women say it's taken a lot of persistence to get to that visibility level in aerospace-related careers, from the ranks to executive offices.

There are women in high-profile positions, such as Lori Garver, the deputy NASA administrator, and closer to home, Joanne Maguire at Jefferson County-based Lockheed Martin Space Systems.

After peaking in the 1990s, the number of women nationally working today in aerospace-related fields is roughly 10 percent, and women make up about 18 percent of engineering students, according to several studies and organizations.

Still, the National Science Foundation reports that between 1999 and 2008 the number of women entering science and engineering graduate programs increased 31.3 percent. During the same period, the number of male graduate students entering those fields was up 15.8 percent.

"We've got a ways to go, but I'm really encouraged about what's going on," said Debra Lasich, executive director of the Women in Science, Engineering and Mathematics program at the Colorado School of Mines.

At Mines — considered a top engineering school — about 25 percent of undergrads are women, and Lasich said women hold about half of student leadership positions.

"Research has shown that women need to see how they can make the world a better place, that they are making an impact," Lasich said.

To attract women, "you have to show them that regardless of whether it's physics or aerospace, there are ways to make the world better with engineering, and you're not just in a cubicle," Lasich said.

Jackie Sullivan, an associate engineering dean at the University of Colorado at Boulder, has pushed programs for years that aim to entice more people to the world of engineering.

The time to begin, Sullivan said, is in elementary school, since "if you don't have them by middle school, you're going to lose them."

At CU-Boulder, more women are entering the engineering school, although most are attracted to chemical engineering, environmental engineering and biochemical engineering — fields where Sullivan said women say they feel they are "being in a helping profession."

Two female professors on the CU aerospace engineering faculty — Kristine Larson and Penny Axelrad — are disappointed that despite efforts, the number of women getting into aerospace hasn't changed much in the past 20 years.

Aerospace requires "teamwork and looking at the big picture," said Axelrad, whose research focuses on using GPS in satellite orbits, remote sensing and airplane landings.

Axelrad credits having good advisers with keeping her on track.

"I always felt I was being judged as a woman on how I did," she said. "I was nerdy anyway, and I wasn't worried about being cool."

Today, she mentors graduate students, and finds the women get more discouraged if they do badly on a test.

"We have to change that mojo," Axelrad said.

Larson, whose research uses GPS to study plate tectonics and ice sheets, said many women engineers are attracted to the field if they had a family member who was an engineer.

It also helps to have "very thick skin," Larson said. She recalled an incident 10 years ago during a faculty meeting.

"An elderly faculty member said, 'I only see one woman here. Would you take notes?'" Larson said. "Another professor handed me a pen. I think that made me angrier than anything."

Those days are gone, Larson said, with efforts being made to show young students — and just girls — how they can enjoy engineering and science.

"The geek factor has gone away as a negative," said Elliot Pulham, chief executive of the Space Foundation, which hosts the annual space symposium.

The doors to a more diverse aerospace industry will open much wider with the proposed increase for commercial spaceflight in NASA's budget, Pulham said.

The new money should foster development of small, entrepreneurial aerospace firms where a number of women find the flexibility to juggle a career and children.

Women- and minority-owned aerospace-related businesses have caught a break for several years when government contracts are awarded, but, Pulham said, "You have women who are competent and can do the job and aren't just figureheads."

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