

by Margaret Wertheim

When you are a citizen of the universe, galaxies are your friends and looking ahead can mean several billion years

Falling for the stars

In an unusually clear American voice, Sandra Faber is telling me about the night she realised that she was a citizen of the universe. At the time, she wasn't floating in a tank, chanting mantras or meditating — she was looking at the stars. For Faber, this was nothing unusual as she is a professor of astronomy at the University of California, and one of the pioneers of the study of galactic motion. But on this particular night, something special happened.

What was unique was that this was the first time she had observed the sky from the southern hemisphere. After years of being told by colleagues down under how much more magnificent the southern sky was, she finally took a trip to Chile to see for herself. Standing on the balcony of the huge Los Campanas telescope with the Milky Way arching over her head in all its southern glory, Faber says that the stars seemed so bright that the telescope and the Earth disappeared from her consciousness and she felt surrounded and absorbed by the galaxy. At that moment, she felt herself become a "citizen of the universe". Ever since then, she tells me, "I've had a different attitude to my existence." Most importantly, she says, it has given her a much more long-term perspective about humanity and life on our troubled planet. Instead of thinking about what might happen in the next 100 years, she now thinks in terms of the next few billion years.

Faber is a woman who is used to thinking in large numbers, because her work deals with galaxies — those vast conglomerations of millions of stars which span thousands of light years. For her, galaxies are distinct individuals. But, despite this intimacy, her most well-known work is not on individual galaxies, but on a conglomeration.

She is the linchpin of a group of astronomers known as the Seven Samurai who discovered that all the galaxies in our part of the universe are moving sideways in a vast group. Faber explains that, instead of just flying outwards as the universe expands, our galaxy and those around it are also moving across the universe "like a huge flock of birds". This discovery shook up astronomy, but was soon absorbed into the standard theories. However, it now seems that the further we look, the more galaxies there are which appear to be moving with us. Hence, "the size of the flock is becoming embarrassingly large". If it gets too big there's no way the standard theories will be able to accommodate it — and a radical rethink may be needed.

This attractive and well-groomed woman of forty-seven is not the usual picture one has of a cutting-edge scientist.

What is it like, I ask her, to be at the frontier of cosmology? "I feel incredibly privileged to be one of the few people on the planet with an intimate knowledge of the nearby universe," she says. Faber describes the feeling of observing the cosmos as like being a latter-day explorer who climbs a hill and suddenly sees a new horizon. But with astronomy you don't just see something none of your compatriots have seen before, you see something no human has ever seen before. "That's one of the thrills of going to a telescope — being able to see over the next horizon." And when she does, she says that she feels "as if I'm a beachhead for my species".

Faber is also a beachhead for her sex. As she reaches further out into space, not only is she "boldly going where no man has gone before", she is also boldly going where few women even dared to dream they could go. Like all areas of the "hard sciences" (those which use a lot of maths), astronomy

is still an almost exclusively male preserve. Although Faber acknowledges that she has encountered sexism, she notes that being a woman has also worked to her advantage. For one thing, early on in her career she found herself being assigned to all sorts of interesting committees as the token woman.

While at university, she worked as a summer student with the grande dame of astronomy, Vera Rubin, who is one of the foremost astronomers today and an expert on spiral galaxies. She became an important influence. "She was a wonderful presence," says Faber. "She loved astronomy, she was very good at it, and she had a family which inspired me to think I really could do both." Today, Faber is a respected astronomer (and winner of several awards), and mother of two college-age children: proof that science and motherhood do mix. ●

