Q&A

Heidi Newberg, a physicist and astronomer at Rensselaer Polytechnic Institute in Troy, New York, has won a National Science Foundation grant to create the first partnership between a US team and a Chinese-led astronomy project.

Were you always planning to become an astronomer?
No. I went to graduate school in the physics department at the University of California, Berkeley, but I didn't know what I wanted to study. After my first year, I got a job with the Berkeley Automated Supernova Search, analysing images. I had no background in astronomy and didn't even know what supernovae were, but it sounded interesting because it was unexplored and would make use of my analytical thinking skills. Later, I began working on the distant-supernovae search, which ultimately became Berkeley's Supernova Cosmology Project. The distant-supernovae search did not achieve success until after I had left and started my postdoc at Fermilab in Batavia, Illinois, but later versions of the search benefited from the wrong turns we made starting out. Eventually the data were used in the discovery that the Universe is accelerating. Those findings led to the idea of 'dark energy'. My career has been shaped by a theme — although projects can seem bleak at the start, continuing to work on them can lead to an important result.

How were supernovae found?
First we had to work out what was going wrong. We couldn't have done it without constant funding for the supernova group from the US Department of Energy at Lawrence Berkeley National Laboratory — there has to be a way to keep going long enough to get things to work. You need to learn from your mistakes. One thing we learned is that to find a supernova, you can't record images of the sky once, and come back the next year and expect things to be the same. Too many things in the sky change to be able to tell which objects are supernovae and which aren't. We learned to capture an image of the sky before and after a full Moon to get the best spectra for finding supernovae.

Describe how an early achievement helped to chart your career course.
As a graduate student, I had the task of redesigning a filter wheel that was part of an instrument for the Anglo-Australian Telescope, one of the first Southern Hemisphere telescopes to offer high-resolution and computer-controlled spectrographs. I hadn't worked on hardware. I didn't know anything about optics or filter wheels, but I talked to the engineers and got answers. It came together, but the challenges showed me that with projects that push the envelope of what is known and possible, you are going to have to learn new things.

How did you forge the partnership with China?
It came together from both sides. I had been analysing data from the Sloan Digital Sky Survey in Sunspot, New Mexico, but data collection ended in 2008. So I was looking for a new project. I was interested in working on the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST) in Xinglong, China, because I wanted to continue with a galactic evolution project that I was exploring using Sloan data. But I needed data at a bigger scale, taking measurements on millions of stars. Using LAMOST I will have that, because it can take 4,000 spectra at once. I was also approached by the Chinese delegates as they talked to people involved in building Sloan, to learn how to make LAMOST successful. They contacted me because they wanted people to help them build the software.

What are the challenges in being a member of the first US team to join a Chinese-led astronomy project?
The Chinese structure for science is not similar to US or European structures. In China, individuals rather than teams are in charge. In US and European collaborations, committees are formed with representatives who have voting rights. It is like a democracy. With such different structures, it has been a challenge to define everyone's objectives, responsibilities and rights. The US National Science Foundation expects us to spell out the details in a proposal which might be funded up to a year later, whereas the Chinese organizations want to start working together and see how the relationship evolves, so there is a mismatch.

So have your goals changed?
No. No matter what the top layers look like, the scientists' expectations are similar. The challenge is getting the big organizations to recognize each other's systems rather than getting individuals to work together. I'll travel to China two to four times a year to make this programme a success.

What is your motto?
For the longest time, I told myself, "I can do anything". When I turned 40, I realized that there are some things I simply can't do. Yet my motto got me pretty far before I figured that out. ■

Interview by Virginia Gewin

IN BRIEF

More gifts for education

Donations to UK universities rose 16.5% between 2007 and 2009, says a survey. The Annual Survey of Gifts and Costs of Voluntary Giving, by the Council for Advancement and Support of Education (CASE) and the Ross Group of universities in the United Kingdom and Ireland, found that £1.04 billion (US$1.56 billion) was given to universities in 2009, compared with £895 million in 2007. Of the 2009 total, £511 million was cash income, 33.7% more than the 2007 figure of £382 million. Kate Hunter, CASE Europe's executive director, pins the rise on a government matching plan and more, harder-working fund-raisers. "They are being more proactive and asking for gifts," she says.

Mothers fear for careers

Female scientists in US academia fear their careers will suffer after having a child, and struggle to balance work and motherhood, states a study presented at the annual meeting of the American Association of University Professors in Washington DC on 11 June. 'Experiences and challenges of women combining academic careers and Motherhood', by psychologist Tovah Klein and research assistant Danielle Auriemma of Barnard College, New York, looked at 20 academics, including scientists, in seven institutions. It found that they devote most of their non-childcare time to work, for fear of losing ground. "Women did not feel they were productive enough … in spite of objective evidence [of] productive careers," says the study.

Competition concerns

The US National Academies in Washington DC are launching a study of research universities as a follow-up to their 2005 report *Rising Above the Gathering Storm*. The new study, requested by Congress and slated for completion in May 2011, will assess whether US research universities can compete with those in other nations and meet federal goals for energy, the environment, health and national security. It will look in particular at higher-education state and federal funding trends, says Peter Henderson, the study's director. The 2005 report warned that the United States may lose its global lead to other nations that have been investing aggressively in science and engineering education and research.