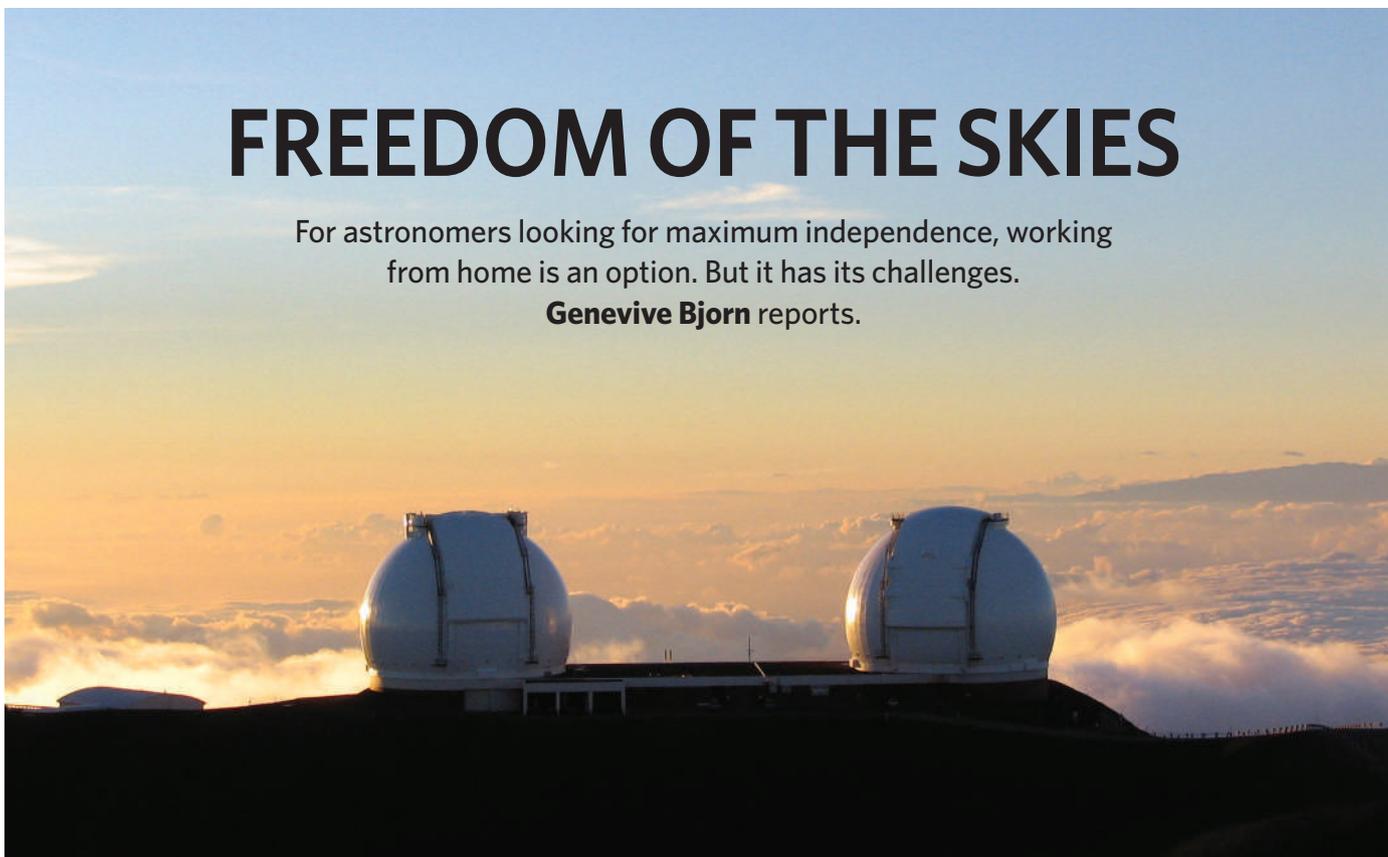


# FREEDOM OF THE SKIES

For astronomers looking for maximum independence, working from home is an option. But it has its challenges.

**Genevive Bjorn** reports.



W. M. KECK OBSERVATORY

**W**hen astronomer Barbara Whitney moved to Madison, Wisconsin, to be with her partner, she had difficulty finding an astronomy job. She decided to switch research fields and pursue atmospheric physics. But working conditions were tough and the pay was low. Frustrated, she left science altogether and went to work for a small-business development centre.

But after a few years missing the fun of research, she started writing astronomy grant proposals. She won all of them. Her success was tempered, however, because she lacked the time and expertise necessary to deal with the complicated paperwork and regulations — so she could not actually receive the money. She decided to join the Space Science Institute (SSI), a non-profit organization in Boulder, Colorado, that manages research grants. Ten years on, Whitney has rebuilt a successful astronomy career.

A small but significant subset of US astronomers are foregoing the security of a university job for the freedom of working on their own. The SSI and a similar organization called the Planetary Science Institute (PSI) in Tucson, Arizona, say their ranks are growing. Anita Krishnamurthi, chair of the American Astronomical Society's employment committee, says there is increased interest in freelancing from postdocs and mid-career researchers — so much so that the topic is now regularly covered at career counselling sessions during the society's meetings. Rejecting the typical academic track, the freelancers conduct research from the comfort of their homes. The benefits are many, but so are the risks. Funding is a constant pursuit, and access to an actual observatory and graduate students are even harder to come by.

Astronomers who become self-employed are generally looking for flexibility, says Krishnamurthi.

She estimates that there are about 200 self-employed astronomers, most of whom left university positions but wanted to keep doing their science. The trend began in the early 1970s when some bright young planetary scientists were seeking independent research without university obligations. They set up the PSI in 1972. Since then, several other non-profit institutes have formed, giving astronomers in need of flexibility more choices for support — and more are being set up.

“The Internet has been key,” says Krishnamurthi. “Now that all the journals are online and everything is web-based, you don't need on-campus library access any more.” The nature of the work also lends itself to independence. Astronomers tend to form far-flung research partnerships, so working with collaborators remotely is nothing new. Most astronomers do not require sophisticated equipment or lab space on a daily basis — just the occasional use of a telescope. Most of the work is done on a personal computer.

The independent career path is similar to non-tenure-track research jobs at universities. The transition into the field is relatively easy for scientists already working on ‘soft money’ — that is they are entirely funded by grant money as opposed to the dedicated salary received at, for example, a university by a tenure-track faculty member — who want more flexibility and freedom.

## How to get started

So far, the independent option is available only in the United States. Self-employed astronomers fund their own salaries and research through grants and contracts offered by organizations such as NASA or the National Science Foundation. These funding agencies place tight restrictions on accounting and management. Individual scientists cannot receive funds directly; rather, an institution such as the SSI or the PSI must



**Two-body problem:** Mike Wolff (top) and Barbara Whitney found solutions.

M. HOLAHAN/METRO

receive and manage grants. The scientists must spend their grant money in approved ways, and the institution must provide regular, detailed financial reports to the funding agency. And anyone receiving money from the US government has to provide proof of compliance with federal acts enforced by the Equal Employment Opportunity Commission, such as the Equal Pay and Civil Rights Acts.

There is an upside, however. Because organizations such as the PSI and the SSI do not have large campuses or bureaucracies to support, the overheads cost as little as half those found at universities. Most provide employment benefits, such as health insurance and retirement plans, for an additional fee.

Outside the United States, there are no organizations like the PSI and the SSI, mainly because funding mechanisms are not in place. Government funds go directly to government agencies, such as the CNES space agency in France, or to public-private partnerships such as Germany's Max Planck Society. Astronomers have the chance to work as independents on soft money only if they come to the United States under a suitable work visa. "Many astronomers work part of the year in other countries, but government funding does not cross borders," says PSI director Mark Sykes.

"Places like the SSI really allow you to do what you want to do from wherever," says Mike Wolff. "If you bring your own money, you have a job." He describes himself as an offsite employee who pays his own way. For Wolff and his family, it solved the oft-encountered two-body problem. His wife had a great job offer in Augusta, Georgia, but he had no prospects there. Unwilling to live apart from her and their children, or to give up astronomy, Wolff obtained his own funding and joined the SSI, where he is now co-director of research and a senior research scientist.

The independent track can help parents deal with family concerns. Heidi Hammel, of Ridgefield, Connecticut, juggles the demands of three children with a full-time astronomy career. As an independent, she can deal with crises in both areas as they happen. "If a proposal deadline is rapidly approaching, I'll work on that," she explains. "But if the school calls and tells me my kid has head lice, I drop everything and go."

That's one of many ways the working conditions are better than in traditional settings. Recovering from an absence, in terms of pay and promotion, can be difficult at a university. Committee meetings, interruptions and excess bureaucracy reduce productivity and add stress.

"Because I am not very self-promoting, I tended to accept lower-paying, lower-status jobs," Whitney says. "By going independent, I was able to catch up in pay with a position that I deserve." She believes that in the



The sky's the limit: being a freelance astronomer can offer a lot of flexibility.



Tom McCord helps to mentor postgraduates.

#### Web links

- Eureka Scientific
- ▶ [www.eurekasci.com](http://www.eurekasci.com)
- Planetary Science Institute
- ▶ [www.psi.edu](http://www.psi.edu)
- Space Science Institute
- ▶ [www.spacescience.org](http://www.spacescience.org)
- Southwest Research Institute
- ▶ [www.swri.org](http://www.swri.org)

university system, it would have been hard to get back to the level she was on before her break.

Working from home also brings challenges, regardless of the field. Feelings of loneliness and isolation can set in after the glow of uninterrupted time has worn off. And it can be difficult to set boundaries with family members, especially young children. Wolff says his three school-age children frequently interrupt him, making his work less efficient and his hours irregular, especially during the summer. He often gets things done while travelling. A regular programme of exercise, talking with colleagues and a good home-office set-up are key to staying productive, he says.

#### Follow the money

But perhaps the biggest potential downside, Krishnamurthi notes, is that you are completely responsible for your own salary. The funding process for independent astronomers is a source of both freedom and stress. Fluctuations in the funding climate create job insecurity and keep some people from taking the risk of striking out on their own. Most independent astronomers devote at least 10% of their time every day to writing grant and contract proposals. "We worry about funding constantly, but somehow manage to hang on and develop successful careers," says Hammel. "But the reality at universities is that you don't have job security either, unless you are tenured."

Independent astronomers can choose their own salaries and give themselves regular pay rises when they have sufficient grant money — a move that must be documented and in-line with industry standards. They need to bring in less money than typical faculty members as the overheads are lower, and they don't generally have to support postdocs, graduate students and a summer salary. "This is a valuable and satisfying career path as long as people are able to handle funding uncertainty and go into it knowing what is involved," says Krishnamurthi. Those who take the risk and become self-employed tend not to go back.

Astronomers wanting to pursue independent research find more success if they have done one or more postdocs, made a name for themselves and had some experience writing grant proposals. "When you've been around for a while, with more experience and knowledge of how the field works, you are in a position to make a better choice than walking into it straight out of graduate school," says Krishnamurthi.

Tom McCord, former research scientist at both the PSI and the SSI, now director of the Bear Fight research and meeting centre in Washington, looks at it another way. "Mentoring with old farts like me is a way graduate students and postdocs can get into the game," he says. It is possible to strike out on your own as a postdoc, he adds. But hustling for funding, studious grant writing and an appreciation of the freedom and flexibility are essential for any real hope of succeeding.

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