The current shortage has several causes. A new production plant in Algeria and an existing plant in Qatar still aren't up to full speed, while through the second half of last year, several shutdowns and slowdowns plagued two US facilities and another Algerian plant. Meanwhile, low pressure stalled a US pipeline; then this spring, a second US plant was slowed down for maintenance.

No one can say when all the snags will be untangled, but Phil Kornbluth, for one, executive vice president of Matheson Tri-Gas, an industrial and specialty gas provider, forecasts improvement by next year if the Qatar plant reaches full capacity. Meanwhile, the shortage has led to financial woes and research headaches.

Rising prices

Thanks to higher costs than budgeted for liquid helium, Robert Hallock, a physicist at the University of Massachusetts at Amherst, may have to do without the work-study student he hoped to bring in this summer as a lab helper. To save on delivery charges, Hallock's department orders large quantities of liquid helium each week, but inevitably winds up paying more anyway because the liquid helium boils off as it sits around in Dewar flasks.

"It costs us more to do our work," says Hallock, who adds that his department uses the liquefied gas to cool magnets for experiments on superconductivity, conduct research in nanoscience, and investigate the behavior of helium. "The bottom line is, you can do less work for the money. Somebody doesn't get hired, or you go without something else."

Janis Research Co of Wilmington, Massachusetts, which manufactures low-temperature cooling equipment, has also been forced to dig more deeply into its pockets. The company's liquid helium supplier, UK-based BOC Gases, imposed a quota last year and Zuyu Zhao, Janis's vice president and principal scientist, says their allocated amount isn't enough. To make up for the shortfall, Janis contracted with another supplier, who has no quota but whose prices are higher than BOC's. "We're absorbing [the higher cost], but it's cutting into our profit margin," Zhao says.

BOC has been forced to impose quotas because of the "supply–demand imbalance," according to spokeswoman Kristina Schurr, who says medical users such as magnetic resonance imaging facilities aren't rationed as much as nonmedical accounts. She adds that the company has been juggling the needs of all its customers while dealing with a limited supply of helium. Making matters worse was the US Federal Trade Commission's requirement that BOC divest some of its helium sources as a condition of being acquired recently by another company.

NASA

NASA, which uses a million cubic feet of helium in every shuttle launch, is one of the many organizations hit by the worldwide helium shortage.

NASA's John F. Kennedy Space Center in Florida is also feeling the pinch. The center, which goes through a million standard cubic feet of gaseous helium per shuttle launch, uses it primarily to purge oxygen from shuttle engines and external tanks. "We've had to work a lot closer with our suppliers so that we can get product when we need it," says Tom Elam, propellants engineer at the center. Right now, the center is trying to conserve helium use; on a longer term, it's looking into ways to cut its helium dependence as well as to recapture helium that's lost to the air, he adds.

Growing demand

The situation is likely to become even more dire in the near future. Kornbluth and Leslie Theiss, field office manager at the US Bureau of Land Management's helium operations in Amarillo, say the worldwide demand for helium is growing, fueled at least in part by the growth of high-tech manufacturing in China, Japan, Taiwan, and South Korea. Companies in those countries use helium in the production of semiconductors, flat-panel displays, and optical fibers.

Meanwhile, the tightened supply and higher costs are prompting efforts in both academia and industry to convert to dry cryostats, or closed-cycle refrigerant units, which eliminate the need to replenish helium. But the systems don't suit everyone. They're costly—up to $50 000 apiece, according to Allen Goldman, a physicist at the University of Minnesota. And some units' base temperatures are limited, able to bring helium down to only 2.7 K, not cold enough for all types of research.

Until other sources are developed, industry officials warn, the worldwide helium supply will continue to be squeezed. "We're producing everything we can here but it just isn't enough," says Theiss. **Karen H. Kaplan**

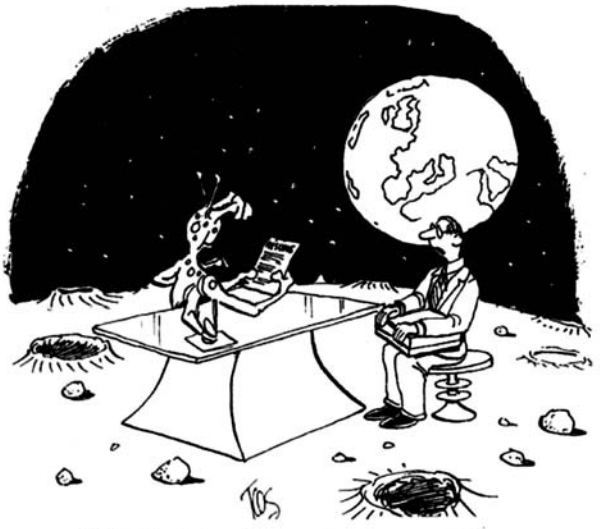
Rumor mills spread word on who's hot and who's hiring

It's no coincidence that the online jobs rumor mills were started by postdocs. But many faculty members also use them—to check how job seekers are faring and to gauge the research directions of other institutions.

Joanne Cohn has on occasion dashed off an e-mail saying that so-and-so got an interview at such-and-such an institution. "I would just feel like it. Some people are information junkies and help pass information around," says Cohn, a member of the astronomy research staff at the University of California, Berkeley, who, with her husband, UC Berkeley astronomer Martin White, last year launched a new astronomy jobs rumor mill—the first as a wiki, a format that allows anyone to edit entries.

Web-based jobs rumor mills saw their start in theoretical particle physics in 1994. John Terning and Michael Dugan were postdocs at Boston University when, frustrated with the job market—Dugan had been a postdoc for 10 years—they started keeping tabs online of current academic job searches in their field. "We would talk to our friends at MIT and Harvard," says

CARTOON RESOURCE



"I'm looking for a secure position in a less competitive academic environment."

Terning. "We had a good idea of who was being interviewed and who was getting jobs." Dugan left research a year later; Terning hung on and in 2001 landed a faculty position at UC Davis. At that point he shed his anonymity, but he continues to moderate the jobs rumor mill he created.

In the meantime, similar jobs rumor mills have sprung up in other fields—including experimental particle physics, astronomy, and nuclear theory. Another site combines theoretical and experimental condensed-matter physics; atomic, molecular, and optical physics; and biophysics. They post job openings, and as the academic hiring season progresses, shortlists are added, followed by the names of people who are offered positions, and finally whether they accept or decline.

Less asymmetry

Some moderators try to verify the rumors sent to them, and some check whether it's okay to post people's names. On other rumor mills, anything goes: "John Doe," the anonymous moderator of the CM/AMO/biophysics jobs rumor mill, says he verifies rumors if he can, "but these are rumors, after all." And, he adds, "I have on several occasions received requests from people on shortlists that their names be taken down, but never complied."

The rumor mill "plays an interesting role in making information that used to be private very public and accessible to all levels of people," says Priya Natarajan, a young astronomy professor at Yale University. For candidates, says Mark Krumholz, a postdoc at Princeton University who has accepted a faculty position at UC Santa Cruz, the rumor mill "reduces the asymmetry. Potential employers can find out who is on what shortlist even without the rumor mill. Job seekers can't."

The main advantage of the rumor mill, Krumholz continues, is that "it lets you know when you are out of the running." For one job he didn't get, he says, "The only way I know is from the rumor mill—my application vanished into a black hole. The rumor mill lets you know where you stand when departments don't." Regarding the new wiki format of the astromill, Krumholz adds, "It's vastly superior. It makes it more accurate and up to date. And it makes it possible for people to keep themselves off the page."

The rumor mill can also be useful for faculty, especially when the subfield of a potential hire is undecided, says a physics professor who wanted to remain unnamed. "By knowing what the competition is, you can argue that your candidate is better." Adds Bira van Kolck, a nuclear theory professor at the University of Arizona, Tucson, "If you know that your second, third, and fourth choices have offers elsewhere, you might try to move faster with your first-choice candidate."

Hot candidates

A potential downside, says Tom Cohen, a professor of nuclear theory at the University of Maryland, College Park, is the risk that committees focus more attention on the people who are on shortlists. "This would be pernicious," he says. "I don't think it happens much, but I'm sure there is some subtle effect."

While some faculty members say they look at the rumor mill during searches, others say they make a point not to—and still others haven't heard of it. Regardless, they maintain that their searches are not influenced by rumors. That runs counter to the perception among junior-level researchers, however. "Being on multiple shortlists raises one's stock," says Krumholz. The rumor mill "unfairly amplifies the chances of the top four or five people in the candidate pool in any given year," adds an astronomy postdoc who requested anonymity. "I hear people talk about 'well, we should interview that person because our rivals are interviewing them.' "

"Committees are people," says Dan

Ralph, a solid-state physicist at Cornell University. "There is a lot of positive feedback in this business. If it looks like one school is getting excited about a candidate, things can start to snowball and it can affect the opinions at other places." In some years, he adds, "if we've been interested in quite junior people, or we have found someone who seems great and we don't want everyone else to make them offers too, we have been secretive and blocked access to our seminar list from off campus." But, he says, a candidate can become hot "with or without the rumor mill. There's enough information about these things. It might happen faster [with the rumor mill], but qualitatively the rumor mill doesn't change the dynamic."

Toni Feder

China selects southern site for neutron source

"The government is pushing us to speed up and do this as fast as possible, and local leadership is very supportive. That is one reason I like doing the project," says Jie Wei, manager for the R&D and construction phases of the China Spallation Neutron Source.

R&D has begun, says Wei, who came to the CSNS from a long career as an accelerator physicist at Brookhaven National Laboratory, where he still spends half his time. The CSNS "is politically in principle already approved," but a feasibility study, environmental assessment, and other paperwork are still pending. Construction will start next year, he says, and the CSNS is slated to go on line in 2013.

The neutron source will start off with an average power of 120 kW—comparable to today's world leader, ISIS in the UK—and is being designed for a future upgrade to 500 kW. Thom Mason, director of the Spallation Neutron Source at Oak Ridge National Laboratory, which is ramping up to 1.4 MW, says, "Additional power is valuable in terms of performance, but there are a lot of measurements where the breakthrough is not in the neutron scattering [intensity] but in the discovery of a new material. The CSNS will have a lower neutron intensity [than the SNS and a 1 MW spallation neutron source under construction in Japan], but it can still be very productive."

"It's not like a discovery machine. If one has a collider with a big luminosity, building a smaller one makes no sense. This is quite different. It's a user facility," adds Wei, who as Brookhaven team leader was in charge of designing and building the SNS's proton ring and transport lines; spallation sources produce neutrons through collisions between protons and heavy nuclei. The CSNS will be used for studies in physics, materials science, chemistry, biology, and medicine, and by industry, he says. As a pulsed neutron source, "it can give you time structure—we can study dynamics."

Initially, the plan was for the CSNS to be built in Beijing. But land is scarce and expensive, the city is busy preparing for the Olympic games, and the area already hosts several large scientific facilities. Instead, the CSNS will be built in Dongguan, in Guangdong Province. By piggybacking on the thriving electronics manufacturing business in nearby Hong Kong, the area has become one of the wealthiest in China. "It's economically booming, but it's business oriented, and there are no major scientific projects there," says Wei. "The southern provinces would very much like to change their image to also become a science and technology center. And CAS"—the Chinese Academy of Sciences, whose Institute of High Energy Physics and Institute of Physics are collaborating on the CSNS—"would also like to have science become more balanced over the whole country." Guangdong is providing land and about $60 million for infrastructure, personnel, and the facility—on top of $150 million for the CSNS from the central government.

"It's a good idea to build [the CSNS] in Guangdong," says Wei. He notes that there are universities in the surrounding area, including in Hong Kong, and two airports within 50 km; the flight to Beijing is 2.5 hours. "There is not a huge scientific user community in China," says Mason. "They'll have to grow that. The demand will get higher, and that is presumably when they'll want to upgrade."

A power of 120 kW was chosen, Wei says, "because $150 million is as much as we can get from the central government for construction." And, he adds, "if we compare the scope of the CSNS to the SNS, our budget is about one-sixth of the US budget." Such comparisons are tricky, however, because of differing accounting methods, says Mason. "You're almost better off counting full-time equivalents and tons of steel." In any case, meeting the budget will be tough, Wei says. "We have to do two things: Keep fabrication in China as much as possible, and collaborate with world leaders in the field, so we can make mutually beneficial trades." One challenge, he adds, is that the "CSNS is China's first proton machine."

Expect more firsts, says Mason. "The Chinese have laid out a fairly ambitious plan for scientific facilities. The summary is, they are going to build one of everything!" (See the article in PHYSICS TODAY, December 2006, page 38.) A reactor for continuous neutrons is already in construction in Beijing, he notes. "It's not just neutrons. They're doing stuff in astronomy, biology, and so on that is very solid fundamental science. They've made a strategic decision that if you want to develop a technology base, you have to have fundamental science as part of it. Japan is clearly now a major player in most areas, and China seems to be getting on an even faster train."

Toni Feder

China's list of planned scientific facilities include a spallation neutron source, which is scheduled to start up in 2013. (Artist's conception courtesy of the CSNS project, Chinese Academy of Sciences.)