

CAREERS

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A roll of the dice

For some, a lack of tenure creates a dynamic lab environment. For others, it's a gamble not worth taking.

BY KAREN KAPLAN

Sean Eddy has his dream job: he is a group leader in computational genomics at the Janelia Farm Research Campus of the Howard Hughes Medical Institute (HHMI), in Ashburn, Virginia. Yet, as he approaches his first cyclical review next year, he faces the prospect of being asked to leave if his work is not deemed worthy of the institute's mission.

Eddy was one of ten scientists who, aiming

to energize their research and forge multidisciplinary ties, decided in 2006 to join a newly opened research institute with unconventional operating and funding models. Although he was once a tenured researcher at the Washington University School of Medicine in St Louis, Missouri, Eddy is unruffled by the lack of tenure at Janelia. In July 2012, Eddy will undergo a review, required for all Janelia group leaders — there are now 26 — after their initial six years. If an external review panel finds his

work deserving, he will be offered the chance to renew for five years. If his work doesn't measure up, he has to be out by July 2014. But the uncertainty of his future never keeps him up at night.

Eddy is “wonderfully stressed” about the review. “I like knowing they can kick me out to the street,” he says. But he isn't revealing a masochistic streak. Remove the security blanket of tenure, says Eddy, and he is driven to work harder, and to assess his research programme more frequently to make sure that it is still on the right track. Furthermore, he says, tenure, which is especially coveted in the United States, brings its own job-related anxieties. “If I'm tenured at Washington University or anywhere, they can't fire me, but they can put me in a closet and take away my space,” he says. “I prefer it this way — I think it's appropriate to have a little fire under you.”

TOP MODEL?

As Janelia reaches its fifth anniversary, its research and culture continue to draw notice, and the question of whether its approach is effective remains unanswered (see page 284). Its operating model was a head-turner in 2000, when the HHMI announced plans to create the research campus; and when Janelia opened in 2006, it sparked articles in the academic, scientific and mainstream press that noted its ‘radical’ departure from the conventional US academic approach (see *Nature* 443, 128–129; 2006).

But executive director Gerry Rubin, a former academic, emphasizes that Janelia's cyclical-review model is not new. It is based in large part on similar models at established institutes that offer fixed-term contracts with reviews and opportunities to renew, such as the Medical Research Council Laboratory of Molecular Biology (LMB) in Cambridge, UK, and the former basic-research model at Bell Laboratories in Murray Hill, New Jersey, which is now the research arm of French telecommunications company Alcatel-Lucent. Similar models at Cold Spring Harbor Laboratory, a biological sciences institute in New York, and the Carnegie Institution for Science, based in Washington DC, also helped to inspire Janelia. The European Molecular Biology Laboratory, which has five sites across Europe, offers rotating contracts too (see *Nature* 478, 547–548; 2011).

Scientists at Janelia and similar institutions don't balk at giving up the comfort and protection of a longer-term job — and in many cases, tenure. On the contrary, they're eager to abandon the academic prototype in favour of a workplace culture in which research is the

► focus and high-risk, inventive projects are the norm. They are also generally less worried about grants, teaching, committee service and other off-the-bench activities. Indeed, despite the job security and intellectual freedom that tenure confers, it is hardly universally relevant or obligatory, argue administrators and some bench scientists. Limited-term, research-focused contracts, they say, sharpen research programmes by ensuring that scientists are actively involved in day-to-day experiments.

Still, only researchers with an appetite for high-risk work and a willingness to change institutions and lab environments should embrace such a model. Young scientists should also keep in mind that labs at these institutions tend to be far smaller than those in academia, which could create logistical problems if people leave. Researchers who enjoy teaching or the university setting are also more likely to find career satisfaction elsewhere.

TENURE TIME-OUT

From the start, Rubin felt sure that Janelia held promise. “We looked at the LMB and Bell and Cold Spring and Carnegie and we saw that you did not have to offer tenure to get the highest quality of scientists,” he says.

Tenure can be antithetical to good science, says Eric Betzig, a group leader in physics at Janelia, who spent six years at Bell. “The chase for tenure enforces a certain conservatism — you learn not to stick your neck out,” says Betzig. “Then, once you have it, it’s possible to get stale. And it’s small enough around here that we can’t afford to have a bunch of stale people.”

Limited-contract institutions typically provide generous funding packages, with a salary for four to five years and enough money to buy equipment and supplies, and hire a postdoc and lab technician. The publish-or-perish imperative of academia is greatly reduced, because such institutions focus more on the researcher’s overall scientific programme than on his or her publication rate.

And, because few of these institutions, at least in the United States, offer classes for students, scientists working at them typically don’t have to teach; instead, researchers spend a lot of time in the lab. At some facilities, such as Janelia and Bell, scientists have virtually no obligations outside their research; Janelia, in fact, requires its scientists to spend 75% of their time at the bench. Other organizations require a nominal level of non-research commitment, such as service on a committee. “The postdocs here are ticked off because the principal investigators are having so much fun,” says Eddy. “At Janelia, we’re all saying, ‘Yeah, I guess I should let the postdoc do an experiment.’” Harald Hess, a group leader doing high-resolution microscopy at Janelia, who also spent 11 years at Bell, says that there are few time-sinks to keep scientists away from the bench at either institution. Rubin agrees. “If you want to work in the lab with your own hands, you have to come here,”



At Janelia Farm Research Campus, scientists forgo tenure for short-term contracts and cutting-edge labs.

he says. “That’s not going to happen at most academic institutions.”

In return for the right to concentrate so closely on their research, scientists tend to be reviewed on how innovative their programmes are, and on the likelihood of field-changing discoveries, rather than on more conventional metrics. “You may not succeed, and you may not have anything to show for your five or seven years,” says Karel Svoboda, a neurobiologist and biophysicist at Janelia who has worked at both Bell and Cold Spring Harbor. “But in this environment, you may still be viewed as successful, even if you don’t have the big paper.”

JUDGEMENT DAY

Review committees at non-tenure institutions examine investigators’ work at set intervals, usually every four or five years; researchers who don’t make the cut generally have between six months and two years to find a new position. Panels can be internal, external or a combination of both. For example, when the first reviews start happening at Janelia, the committee will consist of about 20 scientists, half from the group that reviews HHMI-funded investigators at other institutions, and half from the field of the person being reviewed. The reviewees will give 45-minute presentations on their work to the full panel.

Review criteria vary, but institutions strive to ensure that their researchers’ science is original and creative, and will have an impact. “We don’t just count papers or citations, we make a judgement about whether people are doing something that’s worth doing,” says Hugh Pelham, director of the LMB. Carnegie asks whether the reviewees are taking advantage of the opportunities provided by the institution, notes president Richard Meserve — in particular, that they are effectively using the time freed up by not having to teach or chase grants. Institutions

may consider how much collaboration principal investigators have been involved in and how active they have been on committees; Rubin says he will also provide input on reviewees’ performance as lab colleagues and mentors to junior scientists. At the LMB, Pelham and others who regularly interact with reviewees can step in and disagree with the panel’s comments; Pelham can even override a recommendation to dismiss, if he thinks the reviewee is on the cusp of a big breakthrough.

At Janelia, investigators aren’t allowed to seek external funding, so grant success is irrelevant in reviews. But this is not true everywhere: for example, Cold Spring Harbor does take grant success, and indeed publication rate, into account. Its internal review panel uses both to gauge whether investigators have developed independent research programmes and have the potential to become leaders in their fields. Ideally, the lab would like investigators who are renewed in their fourth-year reviews to earn enough external funding to support 80% of their work by their fifth year.

Meserve declines to reveal Carnegie’s staff-retention rates, but says that “very few” of the scientists hired as permanent staff members have left in the past two cycles. Rubin expects about 80% retention at Janelia.

RISKY BUSINESS

A limited-contract system is not for the faint of heart. “There are risks,” says Sydney Brenner, a Nobel-prizewinning molecular biologist and senior resident fellow at Janelia, who was once a senior researcher at the LMB. He notes that doses of uncertainty are par for the course. “But if you’re passionate enough about doing science, and you have confidence in yourself, you’ll be willing to take them,” he adds.

The pressures of such models are clear. Working at Bell “was an incredibly highly

competitive atmosphere”, says Cherry Murray, a physicist who spent 26 years at the lab in research and management positions, including research vice-president, and is now dean of the Harvard School of Engineering and Applied Sciences in Cambridge, Massachusetts. “You were given some leeway, say for a few years after your arrival, to build up your research programme,” she says. But those who consistently stayed in the bottom 10% after that — who weren’t exploring imaginative, original ideas as assessed by their managers, and whose research never led to an invention or the possibility of one — were politely asked to leave. Evelyn Hu, an electrical engineer at Harvard who spent nine years as a Bell researcher, recalls a chilling prophecy from company management early on. “I remember attending an orientation for new hires and being told, ‘Look to your right, look to your left — in five years, only one of you will be here,’” she says.

Those willing to embrace the pressure may face other constraints. The small size of labs in limited-contract institutes can be inhibiting, says Chris Field, director of global ecology at Carnegie and a biologist and environmental Earth systems scientist at Stanford University in California, where he conducts his research but gets no financial or other benefits. “There are some people for whom Carnegie becomes a stage that’s not the right size,” he says. “Some people find that as they move through their programme, they’re more interested in building a bigger lab group.”

Those running small labs can risk losing a critical mass of personnel, says Douglas Koshland, a geneticist who spent a long time at Carnegie but accepted a tenured position at the University of California, Berkeley, last year. “If you have four people and two leave, then you’ve got two left, and that can be painful,” he says. But Koshland is still a proponent of small labs, pointing out that the same reduced lab size also enables principal investigators to actually do research, rather than just supervise a dozen or more junior researchers.

Jim Broach is a molecular biologist at Princeton University in New Jersey, but he began his career at Cold Spring Harbor. It was lack of teaching, not of tenure, that drove him into academia. “Postdocs aren’t as eager to explore new ideas as graduate students,” he says, noting that Cold Spring Harbor does now have an on-campus graduate

programme, the Watson School of Biological Sciences, founded in 1999. “Teaching benefits your research — you learn to formulate your questions more precisely and you learn how to organize and present your ideas in a very powerful way,” he says.

SOFT LANDING

Being asked to leave a place such as Janelia does not usually spell disaster. Murray notes that any researcher who, voluntarily or otherwise, left Bell while she was there had no problem finding an industrial or tenured academic research position elsewhere. For some, that is a fair exchange. Joanna Aizenberg, a materials scientist at Harvard, spent nine years at Bell, where she loved her work. But when the company began to move away from a basic-research focus to concentrate more on applied, product-driven research, she decided to resign. Shortly after Aizenberg left the company in 2007, she accepted an offer at Harvard. “It’s obviously wonderful to have tenure,” says Aizenberg, “and to think that whatever happens, I have it.”

At Janelia, group leaders who don’t receive a renewal offer for a second term will get transitional funding of up to US\$1 million a year for two years, a bonus that significantly boosts their recruitment value. Those who get a renewal offer but decide to leave anyway can take their HHMI investigator status, and they get the same transitional funding. “You show up with a really big cheque in your pocket — that’s really valuable in academia,” says Tim Harris, director of the applied physics and instrumentation group at Janelia. At the LMB, those who are asked to leave are given a month’s pay for each year they’ve worked at the Medical Research Council, up to a maximum of 21 months, and get about a year’s notice before they actually have to leave. At Cold Spring Harbor, researchers are reviewed four years into their five-year contracts, so if they are asked to leave, they still have a year to find a job, and may have some money left over from their start-up packages. At Carnegie, departures are often based on mutual agreement. Scientists who go elsewhere receive a lump sum representing their unused annual leave.

Supporters of the short-term model note that tenured academic positions are tough to find — and, in any case, few jobs have long-term guarantees. “Having any job in research, especially now, is such a gift,” says Hess. He says researchers should focus on their innovations, rather than on how long their jobs will last. “For me, the reward has always been on the positive side — what’s exciting, what’s new, and to not be fear-driven about when my job might end,” he says. “It’s really a blessing to have this kind of opportunity — where people pay you to do what you love doing.” ■

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“It was an incredibly highly competitive atmosphere.”

Cherry Murray

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UNIVERSITY SCORING

Movement in the ranks

The California Institute of Technology in Pasadena ranked first for physical sciences in the 2011–12 World University Rankings for subject areas, released last week by *Times Higher Education (THE)* in London. Harvard University in Cambridge, Massachusetts, topped the list for life sciences. Changes to the criteria, including a longer collection period for citations, contributed to differences from last year: Pierre and Marie Curie University in Paris rose from 191st place to 30th in physical sciences, and Wageningen University and Research Center in the Netherlands soared from 166th to 17th in life sciences. The *THE* based its findings on indicators in five weighted groups, including research, citations per paper, teaching performance and international engagement. US institutions dominate, but Phil Baty, deputy editor of the *THE*, predicted that China, with its increasing science investments, will soon have a greater presence.

NETWORKING

Mentors wanted

A US science-mentoring service is seeking more advisers after a surge in demand. Since launching an enrolment campaign on Facebook, LinkedIn and Twitter in September, MentorNet, a non-profit group in Santa Clara, California, has signed up 320 graduate and undergraduate students, largely women and mainly from minorities, who want mentors in research and industry. Since 1997, MentorNet has made 30,000 connections, using grants and fees from about 100 US universities. The economy and tight university budgets have hindered expansion, but social media have helped to extend the service beyond member universities, says president and chief executive David Porush.

PHD CANDIDATES

Better student stability

More European nations should recognize doctoral students as employees, said Eurodoc, a Brussels group representing PhD candidates in the European Union, in a statement on 1 November. Norway, the Netherlands and Denmark already classify PhD students as professionals, and give them salaries and benefits. Adding stability and security could draw more people to research, says Sverre Lundemo, Eurodoc’s mobility coordinator. Eurodoc is discussing the matter with the European Commission, he says.