Steps to **success**

Combining teaching with research is always tricky – particularly if you're aiming for tenure. **Angela Spivey** looks at how to get ahead

For most scientists working in academia, the ultimate goal is to achieve tenure. It's a competitive, often cut-throat journey. According to the Federation of American Societies for Experimental Biology, just 30 per cent of biomedical sciences PhDs hold tenure or tenure-track positions. But for those who have landed one of these coveted positions, the reward is security and academic freedom. Whether you're tenured or working towards it, juggling the rigors of research, teaching and administrative duties is key to furthering your career. How do you achieve this balance?

How to get ahead

One way is to avoid growing your lab too large too soon. In the early years especially, resist the temptation to hole up in your office; do much of the hands-on bench work yourself. "Graduate students are hard to train. For many years, the best hands you'll have to do the experiments are your own," says Jonathan Yewdell, senior investigator in the Laboratory of Viral Diseases at the NIH's National Institute of Allergy and Infectious Diseases.

Building a research career while carrying a teaching load can be challenging and time-consuming, often requiring a 60 hour-plus week. Make those hours count by setting priorities and rigorously sticking to them. Successful scientists often choose one teaching and one research goal each year, and then keep those goals sacred. The nature of the academic year can also help: at many colleges and universities, two semesters add up to only 26 weeks, which leaves half a year for research.

Karen Snetselaar, chair of biology at St. Joseph's University, found that teaching actually enhanced her research. She trained undergraduates to do the microbiological work of screening mutants, a task that would have been tedious for her graduate students, but was exciting for students who had never grown cells before. "I would never have done that particular project if I hadn't been working with undergraduates," she says.

Once tenured, avoid shifting too much of your workload into administrative or service roles, which can deflect you from your path to full professor. Keep research at the top of the list and perform service activities as time allows.

Those still on the tenure ladder, be warned: not all service activities are created equal. Serving as a peer reviewer of journal articles or grant proposals makes both you and your institution more visible in your field. And, such activities often hold more weight in tenure decisions than service on departmental committees.

Don't discount the need to write and present your work well. Continually cultivating these skills will help you to produce high-quality grant proposals that secure ever-more scarce funding, write compelling and clear journal articles, and win over new employers, colleagues or collaborators. "It takes the complete package to succeed in science," Yewdell says.

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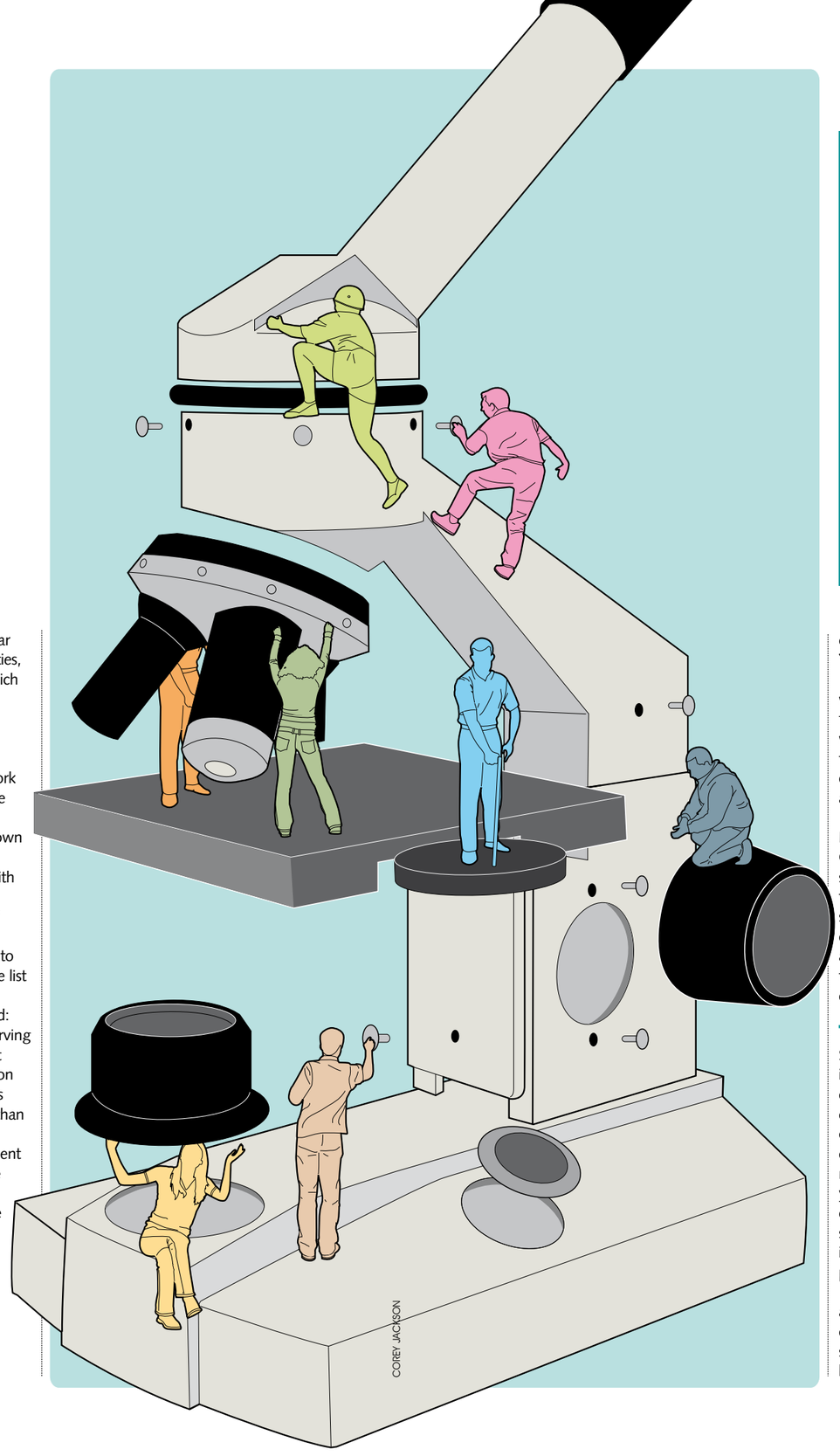

If you want to stay on the tenure track but want a more even distribution of research and teaching, consider a position at a small college, where teaching is considered more heavily in tenure decisions. To conduct research in that environment, you may need to find a niche that accommodates less frequent publications.

Drew Cressman, biology professor at Sarah Lawrence College, studies the role of the protein CIITA in the molecular regulation of the immune system. "There's a small group of us looking at this particular protein, so the chance of getting scooped is a bit less," he says. Special avenues of funding may be open to such scientists, such as NSF's Research in Undergraduate Institutions, for investigators who provide significant research experiences for undergraduates.

The other side

Some scientists find the grass to be greener in industry, which employs a larger share of scientists and engineers than education or government. Pharmaceutical and other corporations offer the chance to do rigorous, deadline-oriented work that can bring the rewards of producing tangible products. But you generally have to choose the academic or industry path early on. In the biomedical sciences, for example, most scientists move to industry early, shortly after running a research project as a postdoctoral fellow.

For scientists already well established in academia, consulting on the side for industry can open some doors. But unless you're a courted superstar, you may have to enter at a junior level and work your way up to a senior position in science or business development. "Making the transition often means taking a bit of a step back," says Christopher Palatucci, life science practice leader for executive search firm Polachi. The case can be different in chemistry and engineering, where good scientists have been known to move back and forth at will.

Drawbacks of industry work include less research freedom. Corporate scientists may have some room to pursue their own ideas, but always within the bounds of their companies' goals.

Other scientific roles can be found on Capitol Hill shaping education and science policy, at non-profits conducting or directing conservation science, or at observatories mixing research and teaching with public outreach.

With all these options, tenure track or not, most scientists can find a place that provides them with the opportunity to do challenging and rewarding work. ■

Alternative teaching strategies

Decades of research on learning styles, the rise of Google, accreditation of online universities and even students themselves are pushing teachers to move beyond old-fashioned lectures.

Students can listen to a lecture or get definitions online, but they need teachers to help them navigate the vast amount of information, choose the most reliable bits and synthesize them. "If all a university or any teacher is doing is disseminating content, they're obsolete," says Robert Beichner, professor of physics at North Carolina State University.

Most institutions have adopted alternative teaching strategies only sporadically, but the movement is growing. Rensselaer Polytechnic Institute reformed its curriculum around interactive learning and 50 universities have adopted Beichner's method for student-centered learning in courses with large enrollments.

Individual teachers try different strategies too. Darby Dyar, chair of astronomy at Mount Holyoke College in Massachusetts, makes students think critically about science by asking them to find a movie or news story that addresses a science topic such as global warming.

Students can benefit when teachers step outside their comfort zones, says Christopher De Pree, associate professor of physics and astronomy at Agnes Scott College. When he found out students in his seminar on 'life in the universe' had never heard of Ray Bradbury's short-story collection *The Martian Chronicles*, he assigned it even though he wasn't sure he was ready to teach it.

"Be willing to give up some of that control and authority for a common space where everyone can contribute, and students feel much more comfortable," he says.

Contacts

» **American Association of Pharmaceutical Scientists**
www.aapspharmaceutica.com

» **AAAS Science and Technology Policy Fellowships**
fellowships.aaas.org

» **NSF Directorate of Undergraduate Education**
www.nsf.gov/div/index.jsp?div=DUE

» **National Science Teachers Association**
www.nsta.org

» **Student-Centered Activities for Large Enrollment Undergraduate Programs**
scaleup.ncsu.edu