

# Getting schooled

**W**hen Carol Thornber took her first faculty position last autumn, she inherited teaching responsibility for two undergraduate courses. Although Thornber, a marine ecologist, had to some extent been prepared by a unique postdoctoral training programme, making the transition from student to lecturer was far from plain sailing.

Her autumn course in upper-level marine botany, at the University of Rhode Island in Kingston, had her scrambling to learn East Coast species of algae and scouting field-trip sites. Her spring class, introductory biology for some 130 first-year undergraduates, had her struggling with endless administrative duties. But by the middle of the year, Thornber says, she had made a discovery that changed the way she worked.

"I realized I couldn't let teaching take all of my time," says Thornber. "To get tenure here, I need to do research and I like to do research. So I took one day a week and kept it as a research day."

Teaching, especially undergraduate courses, with all its preparation and in-class time, takes up more of a young lab head's time than anything else except research duties. Unfortunately, it is often an activity in which a rookie investigator has very little experience. Facing a classroom of eager young minds may be overwhelming, particularly for junior faculty members who have never led a course themselves.

But there are some techniques you can learn to save yourself from drowning. Some fellowships and programmes exist to prepare researchers to teach (see 'That'll teach you', opposite). But most new investigators



**Stars of tomorrow: many lab heads are moving away from straight lectures to teaching systems, such as putting students into 'learning teams'.**

won't get such formal training. Instead, they should rely on mentors and scientific societies for resources. New teachers can also develop strategies, in terms of organizing materials and starting small. Once you've cracked the time-management dilemma, you can innovate and adjust — and ideally create both a balance and an interplay between your research and teaching.

Once in a junior faculty position, all veterans agree on the first step: find a teaching mentor. Ideally, a mentor should be someone who pays attention to the educational developments in your field of science and whose teaching style you admire.

## You're not the first

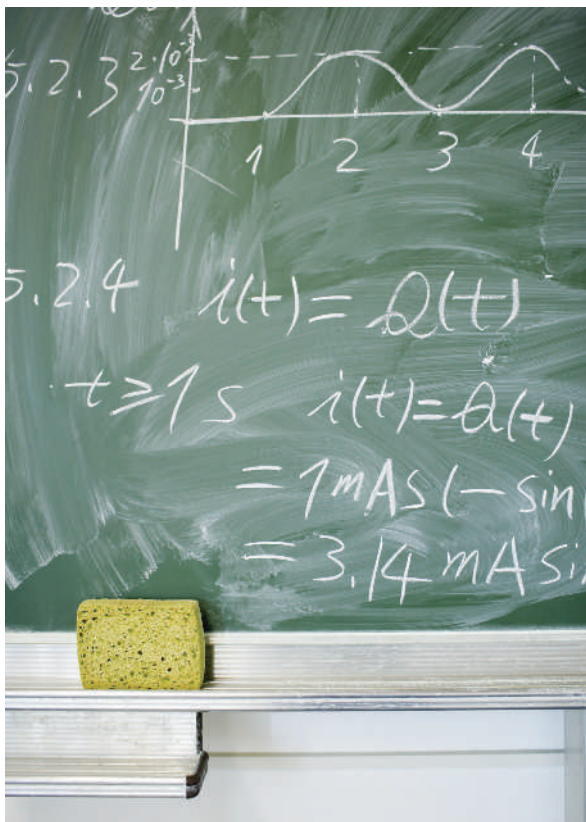
"Have someone be your guide who's already made the mistakes you don't have to make," says Mike Zeilik, an emeritus professor of astronomy at the University of New Mexico in Albuquerque. No one is the first to teach any type of class, no matter how much it feels that way. Zeilik's own mentor was an engineer who invited him to tag along to a meeting on physics education.

That experience and his later work on improving astronomy education opened his eyes to another important source of help for new investigators. "Most professional societies have a committee on teaching or education. Find out who those people are and get in touch to find out what resources are available," he suggests. There are myriad tools for typical introductory courses in almost every field, he says, and these can sometimes be found at the committees' websites.

More and more science departments are turning away from the standard straight lecture format. Zeilik and other experts recommend keeping up with the best-tested practices for active cooperative learning — this could make your teaching job easier and more effective in the long-run.

**To juggle teaching and research, classroom veterans advise beginners to draw on mentors and all the resources they can find.**

**Kendall Powell** learns about the balancing act.



For her introductory biology course, Thornber relied heavily on the prepared materials and slides that came with the textbook. She also took advantage of the extra administrative support her department provides for large courses. But even in the algae course — her specialist subject — Thornber realized she needed help from more experienced colleagues.

Start small if you have the chance, says Japanese native Masayuki Numata, who set up his molecular cell biology lab at the University of British Columbia in Vancouver three years ago. As English isn't his first language, Numata opted to ease into his teaching responsibilities with a very small course tutoring medical students. His major duty was to stimulate discussion among students dissecting mock patient case studies.

"In the future, I'll have to teach bigger classes, but now I can handle it with less stress," says Numata. "Now I know how to encourage students to learn and have established my teaching style."

### In at the deep end

Not everyone has the luxury of a such a transition. Although some institutions give new researchers a teaching hiatus of one or two years, others expect you to jump right in. No matter where you land, says Jerry Hedrick, director of the Professors of the Future programme at the University of California, Davis, "there will be teaching-intensive times and research-intensive times". Plan accordingly by looking at your two-year and five-year goals and — just like a grant deadline — give yourself a cut-off point for teaching preparation, he advises.

Darcy Kelley, a neurobiologist at Columbia University in New York, agrees. "Time management is of the essence for junior faculty members," she says. "Use the law of diminishing returns and decide what's necessary and what's obsessing." One trick she uses is to teach all of her courses in one semester, to ensure that her autumn semester is free to focus solely on moving research projects forward. Also, she notes that teaching afternoon classes forces her to spend only the morning hours that day to prepare.

Both new and experienced teachers emphasize the importance of time management, and warn beginners not to waste effort on 'reinventing the wheel'.

Thornber follows wisdom she found in Robert Boice's *Advice for New Faculty Members* (Allyn and Bacon, Needham Heights, Massachusetts, 2000). She begins preparing for lectures early by hammering out a quick outline. "When I sit down to write a lecture



**Making a point:** Carol Thornber, right, quickly realized that she had to strike a balance between teaching duties and research.

I already have some notes and don't have a mad crunch right at the end."

Mentally separating your commitments can help lessen stress, too. "It doesn't help if you are teaching and thinking, 'I should be writing a paper now,'" says Susanne Mandrup, a molecular biologist at the University of Southern Denmark, Odense. "I often think I have too many other things to do, but once I'm in the classroom, it's fun. It's better to be positive about it and take the students seriously," she advises.

"Be prepared" is the ultimate time-management advice from Eric Mazur, an applied physicist and education researcher at Harvard University. "Doing a good job teaching is not necessarily more time-consuming than doing a bad job of teaching," he notes. Standing in front of 500 first-years is not that different from standing in front of 500 colleagues at a meeting, he says — and is much less intimidating.

### Think of it as an art form

In fact, once you have the organizational and time-management aspects cracked, it's time to think about teaching as experiment or art form. "Do not hold back in innovating in your own teaching," advises Zeilik. "Experiment, you are an experimentalist." The trick, he says, is that as in any experiment, you have to assess the outcome and revise the innovation accordingly.

Others who advocate co-teaching with more experienced faculty members point out that science is never done alone, so why should teaching be done solo?

"Part of doing research is knowing how to convey your results, the methods, and excitement of science to other people," says Mazur. Lecturers are not only preparing the next generation of scientists, he says, but polishing their own communication skills and strengthening public support of scientific research.

Indeed, established researchers say that approaching your teaching in the same manner you approach your research will make it more valuable to you and your students. Instruction, far from being just a necessary distraction from the bench, they say, should be viewed as another part of the job that can be integrated with your research goals.

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### WEB LINKS

NIGMS career development awards  
 ♦ [www.nigms.nih.gov/minority/iracda\\_institutions.html](http://www.nigms.nih.gov/minority/iracda_institutions.html)  
 Professors of the Future  
 ♦ [prof.ucdavis.edu](http://prof.ucdavis.edu)

## THAT'LL TEACH YOU

The ideal situation for would-be junior faculty members is to get teaching experience under their belts before they land their first job. The Professors of the Future (PROF) programme at the University of California, Davis, is one such programme. It teams postdocs up with professors from nearby San Francisco State University to co-teach courses. The programme is one of seven career-development programmes sponsored by the National Institute of General Medical Sciences in Bethesda, Maryland. Each programme brings together a research-intensive university and at least one minority-serving university or community college.

Matching future teachers to institutions is as important as matching your own goals to your training, says Jerry Hedrick, PROF director. Job candidates should know what they are signing up for when taking a job at teaching-intensive or research-intensive institutions, he says. Matching a department's expectations and objectives to your own will help avoid frustrations later.

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