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Faculty: Making Your Research Count

Managing an academic research group means keeping an eye on the big picture—long-term goals, funding agency priorities, and a publication plan. Faculty members are also charged with training students and postdoctoral fellows. To meet these dual demands, principal investigators must match people to projects in way that gets the group to its goals while encouraging its members to mature as scientists. Faculty members don't usually get formal training in research program management, but that might be changing. **By Chris Tachibana**

When **Robin Wright** was a new professor, her approach to setting up her research group was "kind of organic." She considered how many postdocs, students, and technicians she needed when writing a grant, but once funded, she says, "I just got the best people I could and assumed we were all equals and everyone, including me, would do everything, including the dishes." The strategy worked. Wright is now University of Minnesota associate dean of biological science administration and is starting CourseSource, an online science education journal. But if she launched a new research program again, she says, "I'd be more intentional in thinking about how people would fit into the group, what they'd bring personality-wise and skill-wise. I'd be more proactive about recruiting promising students from my classes."

Traditional research training doesn't cover developing an intentional management strategy. Although we have some excellent science career guides, we don't have extensive formal literature on research planning, says Wright, but we could learn from management studies. "When I was starting as a professor, I never thought of reading the literature on teamwork," she says, "but there's science behind team building that could make people in your lab happier and more productive."

Producing mature scientists—and publications

Biology professor **Malcolm Campbell** has given a lot of thought to strategic research planning. He powers his genomic and synthetic biology projects solely with undergraduates at Davidson College in North Carolina, which has about 2,000 students. Ideally, says Campbell, students work as full-time summer researchers after their first year, after going through an application process that includes recommendations and interviews. Undergraduate researchers are much more productive in the summer than during the school year, when they have to plan experiments around classes and academic breaks, says Campbell. After training in his group, he encourages students to get experience working in large research institutions in subsequent summers.

Campbell uses an American football analogy to describe his approach to project planning. "If you imagine a full project as 100 yards, I might give students 10-yard subprojects that are designed so that even if they only get a few yards, they don't have to punt, they've still accomplished something that could be a poster or presentation." For overall program planning, Campbell, who has bioinformatics collaborations with Davidson Mathematics Professor **Laurie Heyer**, uses a computing analogy: parallel processing. "We never have students competing," he says, "but sometimes they work on something, like cloning a gene, using different methods. Whoever gets it first, we all celebrate together and move on." At the same time, Campbell lets students design, order reagents for, and troubleshoot their own projects, to give them independence. "Sometimes you nurture and sometimes you let them flounder on their own," he says, "for a rich learning experience."

Campbell says filling the lab with students with diverse backgrounds and experiences creates synergy. The bioinformatics projects spur math students to take biology and biology students to take computer science. Paradoxically, having more students in the lab is easier than having a few. "Having eight students is less work than having three," he says, "because the students start relying on and training each other." Having an office within earshot of the lab helps, says Campbell, because he hears students debating questions. As long as they are on the right track, he lets them work out problems on their own.

Of course, funding is the cornerstone of a successful research program that also trains early career scientists. Campbell's strategy of guiding students from laboratory novice to potential graduate student begins with paying students as summer researchers. He suggests that faculty apply to government agencies such as the National Science Foundation Research in Undergraduate Institutions, and private sources such as the Beckman Foundation, the Waksman Foundation for Microbiology, and Sigma Xi.

Funding also affects program planning with Ph.D. students. In many U.S. graduate programs, continued>

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