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By Elie Dolgin

Management for beginners

So you're a principal investigator - now what?

In the summer of 2004, evolutionary biologist Aneil Agrawal packed up and moved from his postdoc at the University of British Columbia in Vancouver to start his own lab at the University of Toronto. Arriving to find a big, empty laboratory, he set to work buying equipment and installing incubators for his fruit flies. He didn't consider the other organisms he'd need in his lab: people. Concerned about his limited startup funds, he didn't hire a full-time technician. By October, when the university had its annual grad student recruitment, he was still setting up, so he discouraged potential students from applying to join his lab.

"That was stupid," Agrawal says, as those students wouldn't have started until the following academic year. Agrawal admits that his research suffered as a result. "One of the fallouts was I ended up doing a lot of busy work, trying to set up little experiments, and that wasn't a good use of my time," he says. In the end, he had to wait for the next round of applicants, and he employed his first student a full two years after he came to Toronto. "If I had to do it all over again, I'd definitely invest early, take on students, and use my money to get my lab up and going immediately."

As Agrawal has since learned, managing a research lab requires much more than just a scientific plan. Principal investigators (PIs) need to be leaders as well as managers, but there's a

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difference between the two, says Joan Lakoski, a neuropharmacologist and associate vice chancellor for academic career development at the University of Pittsburgh. "A leader is someone with a vision, who really gets everyone excited by that vision," she says. "A manager is just as important, but a manager thinks 'what's the job that needs to be done, and how do I get it done effectively.'"

Being both at the same time isn't easy, but there's no reason to reinvent the wheel. The Scientist talked to many PIs to discover the secrets to their managerial successes. Here are three areas important for first-time PIs to master early , and tips and tricks for getting off on the right foot.

Staffing For Success

Find the finest

"The most important thing is getting the right people," says Helge Grosshans, a molecular biologist at the Friedrich Miescher Institute in Basel, Switzerland. When Grosshans is unsure about potential new lab members, he asks for a

short written project proposal to see if the candidate would fit with his lab's dynamic. Microbiologist Bettina Buttaro of Temple University in Philadelphia avoids staffing problems by involving her lab members. After interviewing potential candidates, "we all talk about them" as a group, she says.

A survey of research articles in Science found that 43% of first authors are postdocs.

Make the most of interviews

Kathy Barker, a microbiologist who left the lab to write the practical laboratory guides, At the Helm and At the Bench, says that young PIs make a common mistake of wasting interviews by being nice. "People treat it like a first date," she says. The hardest thing, Barker argues, is matching different types of researchers to your personal style. If you're a micromanager, a lab with more students might be better than one full of more independently minded postdocs. Too often, young PIs look for technical expertise at the expense of intellectual talent. Over time, "you get better at knowing what you need," she says.

Moderate clashes

In 1997, Richard Rest, a microbiologist at Drexel University, was on sabbatical at Oxford University when he learned that one of his postdocs in Philadelphia was verbally abusing other lab members. Things became so bad that he had to fire the postdoc by e-mail, alert campus security, and warn the rest of his lab not to come in the next day. To preempt similar incidents, Rest says he now talks openly with his lab. "I always feel uncomfortable speaking about personnel issues. No one feels comfortable speaking negatively about another human being," he says, "but I've learned to push aside those uncomfortable feelings, moderate them, and ask more direct questions."

Get a second opinion

A professor in the biology department of a major research institution (who asked to remain anonymous) told The Scientist that "outbursts of rage and blame" by a few postdocs in her lab forced her to call in a university ombudsman and to eventually let the postdocs go. As a result, her lab shrunk from 10 people to four. Afterwards, she ran into a former supervisor of one of the problematic students; he had written a glowing recommendation, but he "rolled his eyes" at the mention of the postdoc's name. Now, instead of relying on written recommendations, she always picks up the phone and asks referees explicit questions to bring out the truth. "I don't just make one phone call; I make at least two," she says.

Capitalizing on Collaborations

Talk about the real issues

Ed O'Neil, director of the Center for the Health Professions at the University of California, San Francisco, has run scientific leadership programs since 2002. At one meeting he met a junior scientist who told O'Neil that he had a conflict with a senior colleague over authorship. The true source of the conflict, however, was something else altogether. "It was about someone feeling mistreated; it was about passive-aggressiveness," says O'Neil. Once the two colleagues sat down together and talked about what was bothering them, the dispute was easily settled and both scientists' names appeared as corresponding authors. "Your success as a scientist is not just based on your sheer brilliance," O'Neil says. "Your ability to play well with others is equally important."

Choose wisely

Another assistant professor at a prominent US research institute who preferred anonymity told *The Scientist* that she had carved a niche for herself as the go-to lab if someone needed to crystallize proteins of a certain highly studied virus. "The word got out that I was working on the structure, and my phone started ringing off the hook," she says. The assistant professor says she had to dance a fine line to maintain confidentiality between different labs that were working on the same structure. She was upfront about her commitment to the first lab, she says, which meant turning down many potential collaborations until the structure was published. Now the original collaborator knows he can trust her, and other labs see her as dependable. (See the Opinion piece in the May issue for a perspective on competing collaborations.)

Learn to let go

Many collaborations fall through when they are established by postdocs or students instead of PIs, says Barker. One reason is that younger scientists can be taken advantage of, with the senior collaborator running the project and the junior partner footing the bill. "Unfortunately, someone often gets screwed," she says. In researching her books, Barker has seen the repercussions of young PIs who dwell on feeling wronged. For peace of mind, her best advice in some of these cases is simply to turn the other cheek and learn from the experience. "Sometimes, you just have to shrug," rather than blame yourself or others for your decision, she says.

Between 1988 and 2005, the share of publications with authors from multiple institutions grew from 40% to 61%.

Know the criteria for collaboration

When evolutionary geneticist Kelly Dyer joined the University of Georgia in November 2007, her tenure committee told her that it was important to establish herself as an independent researcher. This meant largely cutting ties with her past supervisors, she was told. "That's a tricky thing for me, because I enjoy collaborating with my PhD supervisor," she says. "So, it's hard to know what level of collaboration to maintain that will be looked upon favorably." For now, she's working on establishing new collaborations, but plans on keeping in touch with former supervisors for future projects.

A Matter of Time Management

Rank your tasks

When developmental biologist Cassandra Extavour joined Harvard University last year, she was surprised by how little administrative support she received. So, she started making lists to keep track of all her managerial tasks. As her lists shifted from digital to physical, she turned to piles. "I try and keep my desk organized in piles of most important to least important," she says. This allows her to match her activities to her mood: When feeling productive, she reaches for the top of the pile; when she's "brain-dead," she goes for the bottom. Extavour always keeps a list of outstanding chores. That way, "before I leave for the day, I have an idea of what I need to get done the next day," she says.

The average workweek of US scientists employed full-time in academia is 50.7 hours.

Ensure respect for your time

When an assistant professor (who asked to remain anonymous) joined the multilab imaging center of a large university, several senior scientists overloaded her with tasks. She swallowed her pride, worked on weekends, finished the jobs, but didn't receive appropriate recognition. "If you're going to stand on your head, at least get credit for it," she says. Recently, when a colleague approached her with a task he urgently needed that required one of her students to work overtime, she thought twice about it. She made sure the student was willing to take the job, and made it clear that this wasn't the usual routine. The extra work paid off. The colleague "now provides a collaborative contact I wouldn't have

had access to [otherwise]," she says.

Follow your students' lead

In 1997, cell biologist Sandra Schmid of the Scripps Research Institute noticed a drop in motivation in one of her PhD students, who started leaving the lab early and didn't repeat failed experiments. Schmid confronted the student, who explained she wasn't interested in staying at the bench. Over the next two years, Schmid tailored the student's thesis to her main interest: science policy. The student completed her research in partnership with a postdoc and then wrote a more scholarly thesis. Instead of going to cell biology meetings, the student attended AAAS policy forums. Schmid saved time and effort by helping the student change focus and reapportioning her experiments. Now, says Schmid, this former student is a scientific policy advisor for a US senator. "I'm asking for excellence, but I'm asking for it in areas relevant for [her] to succeed," Schmid says. "We've got to get away from students as a labor force and back to the fact that we're training people."

Recognize special needs

Graduate stipends have improved over the years, but some graduate students need to make extra money. It's an issue that needs to be addressed if you want to get the most out of your students, says Rest. He recalls one student who arrived late, groggy and bleary-eyed, because he was working nightshifts at an express courier company. "He didn't think it was my responsibility that he needed money," Rest says. When Rest learned that the student was working all day in the lab and all night in the warehouse, he found a job for him as a dishwasher in another lab. The arrangement helped the student make ends meet while concentrating on his research.

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5 stars...
by Jonathan Jacobs

[Comment posted 2008-07-18 13:24:47]
Excellent complimentary article to the one featured recently over at The Chronicle of Higher Education. Also, the quote:

"We've got to get away from students as a labor force and back to the fact that we're training people."

drives home one of the biggest problems for training in the sciences. Well done!

Management training
by Ellen Hunt

[Comment posted 2008-07-15 14:46:29]
I think every P.I. should take at least one seminar on management. The AEA seminars (American Electronics Association) are excellent. Doing it once a year with all members of the lab isn't a bad idea wither.

P.I.s should also do some reading of Deming, and if you run a large lab doing lots of experiments, read the Poke-Yoke book from Japan by Shigeo Shingo. Poke-Yoke means "mistake proofing" which is central to lab operations. Industrial engineering management can offer a lot. Together, the ideas can make a P.I. much more successful.

Today, unlike 30 years ago, a P.I. runs a kind of small business within the university. I haven't done it, but I am thinking about doing an entrepreneurship seminar to shake up my thinking. With grants down, industry is a different animal and I'm thinking about how to make what I do more like consulting.

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