Guiding Philosophies for Running a Lab

As part of *Cell*'s 40th anniversary celebration, we are spotlighting 40 principal investigators under the age of 40. See the full profiles of all of these young scientists and their responses to this and other questions at http://www.cell.com/40/under40.

Collegiality, Resources, Independence

Jay Shendure
University of Washington

I think that an underappreciated factor in succeeding as a principal investigator is getting the lab's internal culture right. For my lab, the goal is an environment that is highly collaborative, e.g., with open sharing and recombination of raw ideas into better ideas. We have managed to maintain a highly collegial, drama-free environment over these past 7 years, but as the lab has gotten bigger, the interpersonal dynamics is something that one needs to be vigilant about. I truly love coming to work every day—in large part because of the amazing people—and I aspire for everyone else in the lab to feel the same way.

Although I am always happy to step in with ideas of my own, I encourage my trainees to develop the confidence to initiate and pursue their own ideas as well, provided that they are within the broad scope of the lab. I really do view my role as an advisor—providing ample resources, a solid environment, and as much advice as you want on experimental details, as well as the big picture—but at the end of the day, you have to let the trainees make most of the calls and to learn to accept responsibility (as well as to get credit) for those decisions, or otherwise they aren't learning how to function as independent scientists.

As for a personal philosophy: early to bed, early to rise. Get it done today. Don't complain—this life is a privilege.

Unencumbered Pursuits

Nevan Krogan
University of California, San Francisco

I believe that academia should be as free from restriction as possible. Therefore, I think that students and post-docs should be able to tackle a problem with as little intervention as possible from their PI at the day-to-day level. I firmly believe that the most significant advances are achieved when brilliant students and fellows are encouraged to explore their ideas and set free to collaborate with others in different disciplines, unencumbered from micromanagement by a "boss" or the fear of failure. In contrast, I see my role as the driver of the intellectual life of my lab, encouraging my trainees to "think big" and to provide leadership at the higher level. It is this philosophy that I learned from my PhD mentor, Jack Greenblatt, and is the kind of environment that I enjoyed as a student. My goal is to recreate and maintain this kind of energetic and liberal environment with the researchers in my laboratory.

Mutual Inspiration

Pardis Sabeti
Harvard University

One of the most important things to me in running my lab is creating an environment in which everyone supports each other and inspires the best work, where they feel that they are both invested and invested in. It goes without saying that lab members should be exceptionally bright and talented, but when hiring new individuals to my group, I focus first on their judgment, their work ethic, and their care for others. I believe these fundamental personal characteristics are absolutely necessary for successful research and a healthy, happy, and productive lab.

I want my team to be ambitious and competitive, but not with each other, and not even with their field. Instead, we work toward achieving something in a greater cause: the battle against deadly pathogens. My students know I have high standards and that I want them to work hard, not from fear, but from a passion to make a difference and a sheer joy of the work.

Finally, I am deeply invested in every member of my group's future success and well-being. I admire and care deeply for them and am as loyal to them as I believe they are to each other. I am excited to see them as they go out into the world to create their own labs or move into industry or pursue some other exciting endeavor, to advance science and change its culture. It one of the greatest privileges of my life.

Like Hanging Out in a Playground

Kwanghun Chung
Massachusetts Institute of Technology

As cliché and ideal it may sound, my utmost priority is to help students experience the joy of scientific research on a daily basis. I hope they wake up every morning simply thrilled to come to the lab. If working in the lab feels like hanging out in a playground where they can have "fun" exploring and navigating their ideas, I believe we are on the right track. Trusting and respecting each other is a prerequisite to build a pleasant and a sustainable working environment. And it is on these firm grounds that mutual support and open collaboration between lab members can truly flourish. These are key ingredients to constantly boosting morale and moving the team forward to further scientific progress. My lab also makes a point of welcoming and supporting new ideas, as sometimes it's the clean slates that foster breakthroughs.

Personally, I believe science should contribute in the betterment of society and the human race. The intellectual quests we share and endeavor on should be guided not only to enhance deeper understanding of scientific research but also to improve lives as well. Such faith in science will keep us perpetually kindled.

Eyeballs on the Data

Erez Lieberman Aiden
Baylor College of Medicine

Our goal is to write papers that will be widely read, both today and in 10 years. That's hard to do, requires a great deal of patience, a high tolerance for extreme frustration, and a healthy dose of starting over from scratch. But, when surveying a vast terrain of things you might imagine doing, this one simple filter is immensely clarifying. Everyone in my group knows that, if we are working on something, it means that we believe it and that we believe it's important. That's incredibly energizing during the long, sunless journey toward a new idea. I know of no better motivator—certainly not for myself.

A second philosophy is what I call "eyeballs on the data." I strongly believe that the most powerful pattern detection system in the universe is the human eye—vastly better than any statistical tool ever devised. Many of the data sets we produce are far too large to be visualized without significant effort. It's tempting to become overly reliant on statistical analyses. Because we don't believe anything that we cannot see via direct visualization of the data, developing great data visualization tools is essential for everything we do.

Pursuing Cracks in Conventionality

Hana El-Samad
University of California, San Francisco

If we were to make a bumper sticker for the lab, it would be "If you are not passionate about science, you should get a better-paying job." I think it summarizes a big part of our philosophy. Science is too frustrating if you don't have the scientific fire in your belly. Science is also unfulfilling if a scientist does not think out of the box and challenges dogmas once in a while. Spotting the cracks in conventional wisdom or cracking open a big problem often requires a variety of perspectives and tools. A multidisciplinary approach is therefore a must. Finally, a meaningful collaboration on an important question is not only a fulfilling scientific experience but also a tool to accelerate discovery. Collaboration and teamwork are underrated in academic science because our merit system is based on our ability to demonstrate independent achievement. While sensible, this tendency pushed to the extreme can result in loss of the magic that happens when many brains pool their resources to solve a scientific riddle.