

# All You Need Is Mentorship

## The Importance of Scientific Taste



**Robert A. Weinberg**  
Whitehead Institute/MIT

I find it humbling to confess that most of the truly original ideas that have driven my research group's agenda over four decades of time have come, not from my own brain, but instead from the minds of my trainees, both graduate students and post-docs. This on its own might explain why I, rather selfishly, have given them long leashes, allowing them to strike out on their own and craft their own research trajectories.

But there has also been a slightly more altruistic agenda: recently arrived trainees often assume that mastery of a set of experimental strategies and a familiarity with the relevant scientific literature should represent the core of their training. I, in stark contrast, have always viewed my own job quite differently, hoping to train my mentees to think independently, to think critically about their own work and that of others and, most importantly, to develop a sense of which problems are important conceptually and which are, in one way or another, trivial and not worth their time. Developing this last element in the cognitive toolkit is ultimately the most challenging one for many, who would rather direct their experimental agenda toward problems that are sure to yield abundant data rather than those that actually matter. In a time when generating large datasets and mastering novel, elegant technologies has become progressively easier, the temptations increase inexorably to embrace what is new rather than what is truly important in remodeling our conceptual understanding. If I, as a mentor, can imbue my trainees with this last skill—a taste for important problems—I view their experience with me as a major success!

## A Passion for Mentoring



**Maya Schuldiner**  
Weizmann Institute of Science

The biology textbooks that I read as a student described scientists that made great discoveries and changed the world. I decided to become a scientist myself because I wanted to be just like them. However, through the years, I started seeing that although I liked making discoveries, there was, in fact, something that I loved much more. As I started mentoring my very own PhD students I realized that, for me, the best thing about doing science is not the process of discovery itself but rather the process of mentoring other people on the path to discovery.

I love my students. I care about their success and spend time thinking about their needs and about ways to help them grow and flourish. An important part of mentoring, for me, is being someone that they can relate to and not someone that they must look up to. I try to convey to my students that I am not so different than them—I am mostly more experienced.

One important aspect for me is mentoring women to succeed in combining family with a career. Having three children, I know that it is not easy but it is doable. Together with my friends Prof. Nirit Dudovich and Prof. Michal Sharon, we have created a workshop to help women who wish to combine the two to acquire these skills.

I think that much of my scientific success comes from my dedication to my students and to mentoring because I have an amazing team. I will probably never change the world but I am touching the lives of my students. And they might very well change the world. Or their students.

## Pay It Forward



**Hong Wu**  
Peking University

Both my graduate and postdoctoral advisers have been key in my growth as a scientist. With them, I learned to identify and focus on the big questions, while taking risks to explore uncharted frontiers. Importantly, they also taught me to stay critical to myself. As both labs were rather large in size, I had the privilege to interact with many scientists working on a myriad of scientific questions. This “environmental mentorship” has contributed tremendously to widen my knowledge and horizons. In my eyes, effective mentorship depends on the quality of both the direct mentors, as well as the scientific environment they offer.

I have used these lessons as a foundation for my mentorship style, while adding my own touch. I talk to every student and postdoctoral fellow who applies to my lab about my expectations and mentorship goals—they should become independent scientists, not my spare hands. Therefore, they must lead their own projects and follow their own interests. I also emphasize that willingness to accept criticism is instrumental for success and that professional criticism should not be taken personally.

After returning to China, I realized that, in contrast to labs in the United States, there is a general lack of senior scientists and postdoctoral fellows in Chinese labs. With inadequate “environmental mentorship,” direct interactions between mentors and trainees become even more important. Unfortunately, graduate students in Chinese research labs are regarded as the primary force of productivity but are often overlooked as the future leaders in the field. A training program on effective mentorship is therefore desperately needed in China—by teaching the value of good mentorship to our current independent scientists, we will be able to positively impact all generations to come.

### Mentorship Is a Two-Way Street



**Beth Stevens**  
Boston Children's Hospital

Mentors shape who we are as scientists and as future mentors. At every critical step in my scientific journey, I can look back and see the more senior scientist who helped me, whether it was challenging me on my critical thinking, inspiring me to tackle big problems, or reminding me that I needed to ask questions when attending meetings to learn how to become a part of the conversation. The importance of mentors is undeniable.

What is perhaps less well appreciated is that mentorship is a two-way street. The mentee needs to take responsibility and action to capture the attention of potential mentors. Just as other aspects of science are intensely competitive, so too is the competition for the time and interest of more senior scientists. How does a trainee or a junior faculty stand out in a sea of talented and driven young scientists? The student who often captures my attention is not necessarily the one who has a *Cell* paper in press (though that sure helps!) but is the person who consistently asks great questions, engages in interesting discussions, shows they care about the field and where it is headed, and works very hard. As we move up in science, all of us have a responsibility to not just help young scientists become good scientists but to create opportunities for them to shine and show their true potential. So next time you spot an impressive trainee with a fire in their belly, seek them out and engage them. You won't regret it. That conversation could be hugely impactful for both of you.

### A Journey of Equals



**Jens Nielsen**  
Chalmers University of Technology

Throughout my career, my mentoring philosophy has always been based on trust and enthusiasm. Young talented people who want to work in science and engineering should be inspired through enthusiasm. They should be encouraged to embrace all opportunities and to tackle big problems, while pursuing their aspirations for carrying out research that may impact society. Basically, I tell them from the beginning that we should learn new things together and that my primary role as their mentor is not only to help when problems arise or they need to make complicated decisions but also to challenge them so they understand and identify the important questions we should be focusing on. This is a process that involves keeping my trainees up to date on the current status of the research field and aware of the relevance of their own work. Additionally, I include them in publications as early as possible and connect them to the industry and their international peers at conferences and meetings. I generally tend to give an overall direction for a project and let the young researchers (including the PhD students) influence the path of their project, including the choice of methodologies and scientific hypotheses. I see my role to advise, guide, and encourage them during that journey, but I insist the journey to be discussed equally between the mentor and the student in order to foster their independence and creative thinking. In practice, based on my initial ideas and introduction, I expect them to propose which directions they prefer to take, how and why, in a dialogue where we define the problem and the projects together. My knowledge and experience are crucial in this step since I have a better overview about the relevance or technical limitations that a young researcher may not be aware of. However, if they insist on certain paths that I believe may be problematic, but strongly believe in their hypothesis, I let them test their ideas and will support them fully in their endeavor, hoping that, in that case, I am wrong and they are right, and that way we may end up discovering something really exciting!

### The Tightrope of Mentorship!



**P. Robin Hiesinger<sup>1</sup> and Bassem A. Hassan<sup>2</sup>**  
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Both mentoring and being mentored can be hard. One, because it involves people! Two, because it requires compromises between two people with partially divergent interests in the context of a hierarchical relationship. A one-sided benefit is a failure; a two-sided benefit is the goal of successful mentorship. Whenever different personalities are involved, sharing and promoting positive experiences may be more helpful than general advice. Our experience is one of an unusually generous mentorship from our common postdoctoral mentor. Based on this experience, we learned to appreciate open, and sometimes uncompromising, two-way communication. Mentors should be clear about expectations and "mentees" clear about goals. Students and postdocs are not just employees. They work on their own projects and on their own future. Mentors need to recognize their intellectual independence, for instance by allowing them to independently publish or act as corresponding authors on work to which the mentor did not directly contribute intellectually.

Scientific research is not a classical business and the rules and jargon of business management should have little place in the laboratory. Mentors and their mentees are colleagues and partners in a creative enterprise that seeks to solve the mysteries of the universe. When it comes to the business side, when we needed it, we were given the opportunity not only to learn the skills of transforming experimental data into publishable papers and fundable grants but also the right to take projects with us without fear of competition. This is an experience worth sharing.

Scientists often are fiercely independent and ambitious people working in a competitive environment. This makes one size fits all solutions unlikely to be successful. But, if there is one key experience we would like to share, it is this: dare to be open with each other about your thoughts, doubts, and plans. You might not always get what you want, but more often than not, you'll get what you need!