INSIGHTS

LETTERS

NEXTGEN VOICES

Rules all PIs should follow

We asked young scientists to write a rule that all principal investigators (PIs) should be required to follow to improve the experience of young scientists in their lab. Read a selection of their suggestions below. Follow NextGen Voices on Twitter with hashtag #NextGenSci. **—Jennifer Sills**

Encourage debate

Admit when you are wrong and encourage trainees to do the same. Science provides many opportunities to be wrong, whether it be disproving a favorite hypothesis or forgetting a step in a protocol. But young scientists often have a fear of failure or worry about facing repercussions for their mistakes. When PIs openly admit their missteps, they model how disproven hypotheses and mistakes are actually opportunities for learning and growth. Transparency about setbacks also empowers trainees to speak up with opposing opinions, making for richer discourse.

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Take students' questions seriously and answer them constructively. PIs who show students this respect will stimulate their research motivation by demonstrating that the lab is a safe environment to express opinions.

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Give students the freedom to express their views. Encouraging all lab members to share their ideas will help establish a friendly environment in the lab, allowing young scientists to enjoy the research process and grow intellectually.

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Be humble. When PIs interpret data, trainees may not feel comfortable sharing an alternative opinion. By reminding trainees that a PI's intuition may be wrong, the

ILLUSTRATION: ROBERT NEUBECKER

PI can encourage young scientists to cultivate their curiosity, imagine new possibilities, develop original ideas, and judge results objectively.

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Facilitate learning

Invite at least one expert from another field to give a lecture to the research group every month. Learning about other disciplines will broaden young researchers' horizons, stimulate their thinking, and introduce them to different research methods.

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After an experiment, model the correct way to clean the lab and document safety records. By doing this work together, PIs can increase young scientists' safety awareness, cultivate careful and responsible methods, and foster a team spirit among the group.

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Hold monthly lab meetings during which PhD students present their work. These presentations will allow young researchers to gain experience in data representation and science communication and give the PI an opportunity to monitor progress and offer relevant feedback.

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Promote cooperation instead of competition between students within your own lab and between labs. This strategy will create a supportive learning environment for students, enhance their productivity, and expand their skill set through shared knowledge and equipment.

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Foster independence

When making a strategic project decision, demonstrate how the decision is in the best interest of the young researchers involved. Shifting the burden of proof to the PI would automatically give leverage to the young researcher in negotiating the project's direction and give them the power to veto decisions that only benefit the PI. If respect for the young researcher's career prospects were a standard criterion in decision-making, exploitative practices would become untenable.

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If you move from one institution to another, help lab members find new positions. When PIs accept job offers, young scientists in the lab they are leaving face substantial challenges. PIs should provide support to all lab members as they find new positions, even if they don't plan to follow the PI to the new institution.

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Encourage young scientists to do what's best for their budding career, not what's best for your established career. Supervisors should support and mentor their students and postdocs to help them build the skills required to get jobs and navigate their own career path.

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Bring your students to academic conferences. Building a professional network is crucial for young scientists, and PIs can facilitate connections to senior scientists.

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Provide students with opportunities to think creatively. Giving lab members the freedom to explore their unique strengths and encouraging them to think about problems from different perspectives will empower them and improve the quality of their research.

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Provide positive reinforcement

Encourage your students unconditionally. Young scientists may give up if they receive no positive reinforcement for their hard work. PIs should let them try new things. If they succeed, PIs can give them affirmation. If they fail, PIs can remind them that the experience is a lesson that will help them improve.

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Offer honest words of encouragement. Research is difficult, failure frequent, and feelings of inadequacy rampant among young scientists. Words of encouragement from a PI can be the difference between a student giving up or pushing through yet another experiment.

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Recognize young scientists' work both publicly and privately. By publicly giving lab members credit as well as privately communicating appreciation for their contributions, PIs can ensure that everyone in the lab feels respected.

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Create a supportive environment

Support the individual goals and aspirations of each lab member. When PIs acknowledge each person's unique perspective, they can encourage cooperating and celebrating each other's successes, creating an environment where everyone can flourish.

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Organize a homemade group dinner at least once a month. My mentor showed us that cooking dinner is just like doing experiments. While cooking, our group learned the spirit of collaboration. While eating, we talked freely about academic ideas or the progress we had made. These valuable experiences allowed us to relax and feel closer to one another.

Bo Cao
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Treat others as you would have liked to be treated—not how you were treated! Sometimes PIs believe that if they survived an unpleasant training environment, then their students should, too. However, the best PIs try to improve the training experience by working together

with young scientists to overcome challenges. If everyone were required to support members of their lab, the culture of academia would improve.

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Be responsive to the unique cultural needs, such as ethnicity, nationality, gender identity, sexual orientation, health, and socioeconomic status, of your mentees. Culturally responsive mentorship provides mentees with more opportunities to succeed and a greater sense of comfort and safety.

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Solicit feedback and act to address it. Once a year, the PI should request anonymous feedback from all lab members about the lab's culture, atmosphere, science, and integrity. The next year, the PI should report to both the lab group and an independent committee of peers what steps were taken to address concerns.

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Respect young scientists' time

Avoid contacting lab members by instant messaging applications outside of business hours. After work hours, PIs should respect their students' time by using email, which alleviates the pressure to respond right away.

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Encourage students to finish their academic degree on schedule without extensions. PIs have an incentive to keep their PhD candidates for extra time in hopes of getting more data or finishing a project while paying a lower stipend than a postdoc would demand. Such delays adversely affect students' careers and may make them feel frustrated. Moreover, desperation to generate more experimental data could potentially lead to inappropriate experiments or fraud.

Name withheld
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Refrain from contacting lab members on weekends. Young scientists need a chance to reflect, rejuvenate, and contextualize their work. Good science is driven by inspiration, and time away from the work environment is important for both the young scientist and the PI to plan their work, identify gaps and opportunities, and continually assess long-term goals.

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Encourage attainable thesis milestones. PIs should help young scientists determine when abandoning a project is in their best interest.

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Communicate regularly

Talk to your students regularly and listen to their concerns. Frequent communication between PIs and young scientists facilitates immediate feedback, prevents studies from getting stuck, and helps students cope with failures. The PI must listen carefully, acknowledge the students' opinions, and give them the space to have their own ideas. Ongoing dialogue will help students develop critical thinking skills and allow them to start thinking independently.

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Recognize that tasks you find trivial or routine, such as publishing a paper or finding out whether funding will be approved, may seem crucial to the people you supervise. Instead of letting emails about such issues languish, PIs should acknowledge the importance of the subject and provide a status update to prevent unnecessary stress.

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Treat each of the young scientists in your lab to lunch once a month. Food is a great equalizer; sharing a meal can make a PI more approachable. The meeting can also serve as a check-in for the PI to see how each young scientist is doing, in an informal environment where information and conversation flow more freely.

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Schedule regular one-to-one meetings with your PhD students. Such a routine formality will provide students with advance notice and allow them to practice presenting their work in an allotted time frame. Spontaneity does not work for everyone; students deserve the time and space to analyze, interpret, and articulate their own data before a meeting.

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Set realistic expectations

Critically read a copy of your own PhD dissertation before evaluating the work of young scientists. This exercise will remind PIs that they also had a lot to learn early in their career, allowing them to set reasonable expectations for their students. Fostering a more understanding environment could greatly improve mental health for everyone in the lab.

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Actively engage in bench work. PIs who perform day-to-day experiments alongside their mentees will motivate young scientists and ensure that the PI is aware of the challenges they face. The daily presence of PIs will also break down the barriers between the mentor and mentee, which will lead to unhindered exchange of ideas and a more enjoyable and productive work environment free of unrealistic expectations from either party.

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Clarify boundaries early. For young scientists, the "getting to know you" phase of working with a PI can be stressful. Specifying details such as when it is okay to email, how much time is needed when requesting recommendation letters, and whether unprompted doorway chats are welcome can be critical to making young scientists comfortable in a lab. Moreover, this sets a good example for young scientists to confidently set their own boundaries, which, in the long term, can help to fight burnout and imposter syndrome.

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