Over the course of two days, a group of deans, associate deans, program directors, professors, graduate students, post-docs, and other interested parties descended on Ann Arbor, Michigan to participate in the *Future of Bioscience Graduate and Postdoctoral Training* symposium. The discussions were often broad and sometimes spirited. The prevailing theme throughout the symposium was that the trainee must be first and foremost. What changes can be made to improve the training received and the outcomes achieved by those who are trained? Rather than a definitive answer to the problems, I put forward the current proposal in an effort to keep up lively and thoughtful discussions between all parties.

### Undergraduate

Many graduate students start graduate school because they love science and they want to stay involved in science. This is great, and I don’t want to discourage young scientists from pursuing this amazing field, but there needs to be some changes in undergraduate advising. As difficult as it is, advisors need to let students know when they don’t feel they are up to the challenge of graduate school. It simply isn’t for everyone. Students should not be going to graduate school because they don’t know what else to do. Suggesting a post-baccalaureate program is actually a great option, particularly for students who don’t know what they want to do next. There are jobs out there that allow one to participate in science without an advanced degree.

### Masters

Students can be encouraged to really think about their options through a restructuring of graduate school training. This change is one of two somewhat radical changes that I think would greatly improve bioscience training as a whole. Students would be required to obtain a Master’s degree before being admitted to a PhD program. While I admit this change would be difficult to implement, it would...
have benefits for nearly everyone involved. First, students would be able to test the waters without making what is currently a 7-8 year commitment. Instead, students would have a decision point 2-3 years into graduate school. This Master’s program would involve coursework, some lab time (possibly rotations), and a master’s thesis. One interesting possibility with these programs would be the creation of Master’s programs in tracks such as patent law, science communication/policy, or even project management. Thus, we could prepare students for careers in science, without the grind of a full PhD program. Following successful completion of a Master’s degree students have an obvious decision point at which they can decide to continue on to a PhD program, another graduate program, or enter the workforce. Second, students would pay for their Master’s education on their own. Initially, I feel like there could be pushback on this from students, but it would give students a new level of control over their education, and if these programs are successful in placing graduates in good jobs, then students will be willing to pay for the training. This will encourage universities to keep track of their graduate student outcomes, as this will be a major recruiting tool if students are bringing their own money to the table. Finally, this has the added benefit of adding a revenue stream for universities.

Doctorate. Following successful completion of a Master’s program some individuals might choose to continue on to receive their PhD. These individuals would be highly motivated to become leaders of scientific research. My favorite idea of the conference was developed from comments brought up by a current graduate student in one of our group discussions; that is that trainee money needs to be linked to students, not individual labs or universities. Graduate students would no longer be paid for through RO1 grants, leaving significantly more money available to employ full-time scientists. Following completion of the Master’s degree, students that are interested in continuing to a PhD would apply for training grants directly. The number of PhDs could then be regulated (at least to some extent) by the NIH through the number of grants available. Students who obtain funding would then be able to take their money to any lab or university that they wanted to, again encouraging universities and labs to keep better track of their graduate student outcomes, and putting trainees in the driver seat of their education. Finally, these students would come in without the need to enroll in coursework and would be fully devoted to making scientific progress.

Postdoctoral. Following completion of a PhD degree, some individuals may desire to get further training, while some might enter the job market. Personally, I feel that with the changes that I have suggested thus far, there would be limited need for postdoctoral training. Replacing many post-doc positions would be staff scientists, who would be either masters or PhD graduates.

Having a scientifically educated population is critical for the continued success of science in this country. Rather than decreasing the number of individuals interested in science, I think that making the Master’s degree the more common degree among scientists will actually make science much more accessible. As we explore the future of bioscience training, whether it is the vision I have outlined or not, I think that everyone will agree that the future of graduate and postdoc training must focus on the trainee. Let’s keep the discussion going on how we can improve bioscience training.