

GUNTHER

The writing skills are, I think of, essential importance for any of the physics majors here. It

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doesn't do you much good if you do the science just for itself. You want to tell people about it, and you want to be able to do that in a professional manner that really gets the appropriate appreciation for your scientific work. And to do that, you need to understand what is really the form of communication that scientists, physicists use. And that is, I think, one of the key elements in junior lab-- to really explain how this is done, and then through practice, really develop that skill.

So two of the things that the students do in 8.13 and 8.14, in addition to performing the experiments, is to, A, give 15-minute presentations on the experiments in the style of an APS parallel session and write four-page papers on each experiment in the style of Physical Review Letter. And I think there are two elements to this. And one is, of course, that this is a large part of their grade. So this is a skill that we judge. But I think it is also a skill that the students really develop in 8.13 and 8.14. Most of them, before joining the lab, have never written a paper.

And many of them have not given presentations in that style before. Some of them have. Some of them haven't. And so this is a skill that they get to practice. It's a skill that they really need later on. And it's also something that many of them are rather worried about when starting the class. One of our teaching-- one of our writing instructors likes to say, fear of public speaking is one of the top fears that people list when asked what they are really worried about.

And what we tell the students, and what they really find out during the class, is that public speaking is a skill that you can really perfect through practice. And for me as an instructor-- and I hope also for the students-- seeing the progression of them during the semester from really not knowing what to do with the 15 minutes of speaking time to having professional presentations at the very end is really one of the most gratifying things in 8.13, and then later in 8.14, to see how much their skill really improves over the course of three, four months.

So there are many ways in which we try to help the students really develop these communication skills. One is, of course, instruction and examples. Before they do their first presentation, then they give the presentation. They meet with the writing instructors afterwards to go over the presentation and get feedback from them. Typically, what we do is we have 15-minute presentations and then a 15-minute question and answer session that we also use to

give feedback on the presentations.

And then at the very end of the semester, the students take their favorite of the three presentations they gave during the semester, refine it a bit, and then give it in front of the whole class-- again, after getting feedback from the writing instructor. So there's a lot of practice, and there's a lot of back and forth between the students, the writing instructors, and the lab staff.

In 8.13, obviously, at the beginning of the semester, there's an extremely wide spectrum in terms of their communication skills. Some people are just naturally more inclined to talk to a large audience, to present themselves, whereas others are mortified doing that. And I think by the end of 8.13, that spread becomes much narrower. Of course, not everybody will have the same spirit when giving a presentation. But I think by the end of 8.13, everybody is at a level where they have no problem giving a 15-minute professional presentation.

I think 8.14, the focus really moves from just being able to fill the 15 minutes somehow to a much more detailed discussion of the professional elements of the presentations-- the uncertainty analysis, really the depth in which they examine the data that they've taken, and the sophistication of the analysis methods. I think that is more of the focus in 8.14 after 8.13 has really prepared them to-- just the basic tools.